BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

Vol. 46] 1949 [No. 12

MALARIA

SAUTET, J. Etat actuel du paludisme et de l'anophélisme dans la région méditerranéenne. [**Present State of Malaria and Anophelism in the Mediterranean Region of France.**] *Rec. Travaux Inst. Nat. Hyg.* Paris. 1944, Tome 1, v. 2, 176–96, 4 figs.

This is a record of the results of investigations carried out in the Mediterranean regions of France during 1943. At that time there were in that area a large number of immigrants from non-malarious areas, who were under continuous observation.

The history of malaria in southern France prompted special attention to three districts, Perpignan, the southern part of the Gard Department, and the Little Camargue. In the Perpignan region malaria was very prevalent from 1939 to 1942, as the result of the arrival of numerous infected refugees from Spain. Canet was the centre of this outbreak which extended westward to Perpignan, southward to Argeles and northward to the Salces Swamps. In 1942 there were 126 cases in Canet alone. By 1943 the outbreak was all but over ; only a few cases were found in Canet village. The suppression of the outbreak could not be ascribed to measures of control which were limited to the treatment of the sick.

In the south of the Gard Department, 28 cases of *P. vivax* malaria were reported in 1942 among 3,000 young people who had come to help in the grape harvest. Most of these patients had presumably acquired their infections before arrival. There was no evidence of malaria in this area in 1943.

The most malarious region in 1943 was the Little Camargue. Forty-two primary indigenous cases of malaria were observed in or around Saintes-Maries de la Mer, in September and October. In the latter month, 69 cases of *P. vivax* malaria were also observed among immigrants. *P. vivax* was the only species found. Clinically the disease was mild everywhere.

Elsewhere in southern France there was little or no evidence of locally acquired malaria in 1943.

In the Perpignan area four races of *A. maculipennis* were found, *typicus*, *messeae*, *atroparvus* and *cambournaci*. The same races were found in the south of the Gard Department where some specimens of *melanoon* were also found. Adults were plentiful in stables and cattle sheds but rarely if ever found in human dwellings. In Camargue *A. hyrcanus* is reported in addition to the five races of *A. maculipennis* mentioned above. Here zoophilism is somewhat less marked than in other areas ; *A. maculipennis* was often found in dwellings though in less numbers than in cattle sheds, etc. Nowhere were anophelines found breeding in salt water.

Anopheline breeding places are restricted to irrigation canals and small collections of water. Larvae were seldom if ever found in large swamps and marshes ; large reclamation works are not called for.

[The impression conveyed by this report is that the probability of malaria becoming a serious menace to the health of southern France is exceedingly remote, in spite of the very defective sanitary conditions in which sections of the population are living.] *Norman White*

ROBERTS, J. I. **The Parasite Rate in High Altitude Malaria.** *J. Trop. Med. & Hyg.* 1949, Aug., v. 52, No. 8, 160–69.

This paper is largely an analysis of the results of the examination of thick drops of blood, taken from hospital patients in Nairobi, Kenya, during the years 1938 to 1944. The blood was stained by Field's method, and *Plasmodium falciparum* was the only species considered. The figures indicate that an epidemic took place in 1940, when the incidence of positive slides was 28 per cent. as compared with 9 per cent. in the previous two years, gradually reverting to 9 per cent. by 1944. All races (European, Asian and African) participated in this epidemic, though the increase was most marked amongst the Asians. Malaria rates ordinarily become higher throughout the months of January, February and March, *i.e.*, at a time prior to heavy rainfall and a greater density of the vector ; then for about 10 to 14 days before the onset of the rain, there is said to be a very decided increase in these rates. It is suggested that this phenomenon is due to some change in the " virulence and intensity " of the parasite itself. *Anopheles gambiae* was the vector, and although the population had a high crescent rate, the sporozoite rate was unaccountably very low.

The author states that at the high altitude of Nairobi (5,400–5,700 feet), malaria assumes a " lowly and mild " form often unaccompanied by fever, with scanty parasites in the blood and little anaemia. Frequently these nearly symptomless cases, if untreated, progress to an intractable state of chronic debility.

[The title of this paper is misleading ; its contents do not deal with the parasite rate, but with the incidence of *P. falciparum* in blood slides taken from hospital patients, while the high altitude malaria refers only to a single town, at an altitude much lower than that of many epidemic localities.]

P. C. C. Garnham

LACHMAJER J. **Species and Races of Malaria Mosquitoes occurring on the Coast of the Gulf of Gdańsk.** *Bull. Inst. Marine & Trop. Med., Med. Aca ., Gdańsk, Poland.* 1949, v. 2, Nos. 1/2, 91–4, 1 map.

The biology and distribution of anophelines on the southern and western coast of the Gulf of Gdańsk (Danzig) were studied in 1947–48.

The delta of the Vistula, the western coast of the Gulf of Danzig and the Hela Peninsula together constitute a low-lying terrain, much of which contains collections of water such as bogs, landlocked bays, streams and canals. These and artificial water holes created by war operations provide conditions very favourable to the development of mosquito larvae.

The mosquito races were determined from eggs collected in these places or laid in the laboratory. The adult female mosquitoes were caught in their daytime resting places or in their " winter quarters ", *e.g.*, stables, cellars and human dwellings.

The anophelines found were *Anopheles claviger* and the three races of *A. maculipennis*. The area surveyed is shown in a map divided into four sectors. *A. maculipennis maculipennis* was the least commonly found on the coast, and

was not detected at all on the Hela Peninsula. *A. m. messeae* flourished in the fresh-water regions, while *A. m. atroparvus* was most prominent where the water was mixed with salt from contact with the sea, *e.g.* mouths of rivers and land-locked bays. The percentage findings of each type in the four sectors are shown in a table which shows the great preponderance of *messeae*, except in the Hela Peninsula. Another table indicates the mean numbers of eggs laid at one time by female *messeae*, *atroparvus* and *maculipennis*, which were 162·4, 140·8, 133·5 respectively.

The author points out that between races of *A. maculipennis*, especially *messeae*, in different countries there is some difference in the structure of the egg, owing to variation in the number of float ridges. The figures given are for Sweden (14 to 21), Holland (18 to 32) and the Polish Coast (18 to 28).

It is evident that anophelines are present in the whole coastal belt of the Gulf of Danzig. On the respective capacities of the different races to act as local vectors of malaria will depend whether the disease will acquire endemic characteristics, and this has yet to be determined. *A. m. atroparvus* is a vigorous feeder and viable even in winter and is very frequent on the Coast : *A. m. messeae*, though less liable to be infected, may be of epidemiological importance because of the large numbers present ; while *A.m. maculipennis*, is markedly zoophilous and occurs in comparatively small numbers in the area described. *H. J. O'D. Burke-Gaffney*

Ferreira, F. S. da C., Pinto, A. R. & de Almeida, C. L. Alguns dados sobre a biologia do *Anopheles gambiae* da cidade de Bissau e arredores (Guiné Portuguesa), em relação com a transmissão da malária e filaríase linfática. [**Facts on the Biology of *Anopheles gambiae* in the City of Bissau and its Neighbourhood, Portuguese Guinea, and its relation to the Transmission of Malaria and Filariasis.**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 223–50, 5 text figs. (1 map) & 16 figs. on 8 pls. [14 refs.] English summary.

The paper reports a large amount of work carried out in Bissau and its neighbourhood in Portuguese Guinea. The situation is evidently the same as what is familiar in West Africa.

Among the domestic mosquitoes *A. gambiae* is much the most numerous species, the average anopheline rate per house being about 11 with a maximum in November. Among a thousand dissections the sporozoite rate was from 1·4 to 2·5 per cent. in the dry and wet seasons respectively. Larval nematodes which the authors identify as *W. bancrofti* were found in the proboscis in 0·51 per cent. of the dissections. [The identification may be correct, but it would be well to accumulate convincing evidence on that point.]

Precipitin tests carried out on *A. gambiae* were positive with anti-human serum in 55 per cent. The children's spleen rate was 57 per cent. and parasite index 58 per cent. Most of the malaria parasites were *P. falciparum*.

P. A. Buxton

Horsfall, W. R. & Porter, D. A. **Biologies of Two Malaria Mosquitoes in New Guinea.** *Ann. Entom. Soc. Amer.* 1947, v. 39, No. 4, 549–60, 4 figs. [11 refs.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1949, July, v. 37, Pt. 7, 128–9.]

Anopheles punctulatus, Dön., and *A. farauti*, Lav., are the principal vectors of malaria in New Guinea and adjacent islands and possible vectors of filariasis [caused by *Filaria* (*Wuchereria*) *bancrofti*] in parts of these areas. An account is given of observations on their bionomics, made during 1943 and

1944 in eastern and northern Papua and on Biak in the Schouten Group. *A. punctulatus* was most abundant on heavy clay soil, whether at sea level or inland, and was reported to occur as high as 3,500 ft. in the mountains. *A. farauti* was present on the coastal plains where the soil was sand or mud, and both species occurred where the soils intergraded. Larvae of both developed largely in sunlit ground pools, *A. punctulatus* mainly in depressions such as tracks of all sorts, especially in clearings incident to construction of army camps, and *A. farauti* in natural pools, particularly those with floating sticks or vegetation, and grassy margins of sluggish streams. *A. farauti* also bred in partly shaded sections of mangrove swamps subject to only slight tidal fluctuation particularly if floatage was abundant.

A. punctulatus required on the average one day less than *A. farauti* for the egg stage and each larval instar. The mean durations in days of the egg, larval and pupal stages in the laboratory were 2·5, 7·5 and 1 for *A. punctulatus* and 3·5, 11·3 and 1·2 for *A. farauti*. In the field, under very favourable conditions in sunlit sites, the former may complete larval and pupal periods in five or six days. Applications of larvicides must therefore be repeated every five days to ensure its control, but once a week was adequate where only *A. farauti* was present.

Eggs of both species may be deposited on moist surfaces or on water. Those on moist surfaces incubated at the normal rate but did not hatch until floated; they remain viable for 14 days. Larvae of *A. punctulatus* were very active but those of *A. farauti* moved little except when disturbed. Adults of both species were collected on moist banks near villages. *A. punctulatus* was most commonly taken on vertical banks out of direct sunlight within a few feet of a frequently used trail or place where natives sat on the ground to work. The limit of effective flight-range of *A. punctulatus* was determined, by elimination of larvae by oiling in a native area near Oro Bay, to be ¾ mile. Females at a collecting site at this distance from the untreated area were reduced by about 97 per cent. The population returned to normal within six weeks.

Dissection of 414 females of *A. punctulatus* that had probably fed only once in the wild in an area where malaria was prevalent showed oöcysts in 20 and sporozoites in three. Of 132 females of *A. farauti* examined, five contained oöcysts and none sporozoites. Unidentified filarial larvae presumed to be *Filaria* (*Wuchereria*) sp. were found in 3·8 per cent. of *A. punctulatus* and 2·3 per cent. of *A. farauti*.

LEVI CASTILLO, Roberto. **Atlas de los anofelinos Sudamericanos.**

This book is reviewed on p. 1193.

LUCREZI, G. Quadri ed atteggiamenti midollari nella malaria cronica. [**Reaction of Bone-Marrow to Chronic Malaria Infection.**] *Riv. di Malariologia.* 1948, Dec., v. 27, No. 6, 231–53. [29 refs.] English summary (9 lines).

For a long time the author has been engaged in a study, by means of sternal puncture, of changes in the bone-marrow that occur during chronic malaria infections. In this paper he gives the results of differential cell counts of the marrow in seven patients suffering from chronic malaria. The reaction of the marrow to the infection is essentially parenchymal and "haematogenous" [*sic.*]. The changes are varied and inconstant. There is rarely any marked change in the reticulo-endothelium. The author believes that the destruction of red cells is not solely responsible for the changes in marrow structure observed; asthenic, inhibitory and toxic factors are also involved. *Norman White*

REIN, C. R., BUKANTZ, S. C., KENT, J. F., COOPER, W. C., RUHE, D. S. & COATNEY, G. R. **Studies in Human Malaria. XIX. The Course of the Complement-Fixation Reaction in Sporozoite-induced St. Elizabeth Strain Vivax Malaria.** *Amer. J. Hyg.* 1949, May, v. 49, No. 3, 374–84, 2 figs. [15 refs.]

The course of the complement-fixation test was studied for 18 months in 87 prisoner volunteers infected with sporozoites of *P. vivax*, St. Elizabeth strain. The antigen used was an alkaline phosphate buffer extract of *Plasmodium knowlesi*. A total of 6,604 samples of serum were examined during the course of the study. Positive serological reactions were associated with all but 4 of 199 malaria attacks affecting the 87 subjects.

Positive complement-fixation reactions appeared in primary attacks 7·2 days after patent parasitaemia and 6·2 days after the onset of fever (averages). In relapses these intervals were 4·4 and 2·3 days. The test remained positive for 42 days during primary attacks and for 125 days during repeated relapses.

The complement-fixation test might be useful in identifying recently subsided attacks of *P. vivax* malaria but would be of no value in diagnosis early in an attack or in the long latent period between early and late activity. During recurrent attacks the test could detect more infected persons than could the examination of blood smears. *Norman White*

FIELD, J. W. **Blood Examination and Prognosis in Acute Falciparum Malaria.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, July, v. 43, No. 1, 33–48, 12 figs. [14 refs.]

Divergent opinions as to the frequency or rarity of severe cases of untreated *falciparum* malaria with "negative blood slides" and as to the value of blood parasite counts in the prognosis of *falciparum* malaria prompted the observations recorded in this paper. Records of 2,136 cases of acute uncomplicated *falciparum* malaria that were treated in the Government Hospital adjoining the Institute for Medical Research, Malaya, during a number of years, were studied. Fifty of the patients died. Parasites in blood films were counted daily during treatment. Thirty-nine of the deaths were in patients whose peripheral blood before treatment showed at least 100,000 parasites per cmm. Only three fatal cases had peripheral blood parasite counts of less than 10,000 per cmm. It seems clear that in Malaya parasite counts in adult Asiatic patients suffering from untreated *falciparum* malaria are of great prognostic significance; high counts indicated a high risk, low counts a low one.

When parasitaemia is reduced by treatment, prognosis from blood films becomes less reliable. Death may occur when the number of parasites has fallen below the level at which they may be found by thick-film examination. Most of the fatal cases in this series, however, still showed high parasitaemia on the day of death.

Schizonts are more likely to be associated with high levels of parasitaemia; their presence at lower levels of parasitaemia did not necessarily indicate clinical gravity.

The author is sceptical of the view that serious, even fatal, *falciparum* malaria may occur without parasites ever reaching the peripheral blood. Valid evidence of such occurrence must meet the demands that: other possible causes of the symptoms are excluded; the parasites have not receded from the blood as the result of earlier treatment; the staining is reliable; parasites are found at autopsy in vital organs.

Six patients in the series survived infections with parasitaemia of 500,000 per cmm. or more.

The author advocates the adoption of routine parasite counts in all serious cases of *falciparum* malaria. Made before treatment is commenced they give information which cannot be obtained in any other way. The technique is simple : a count of parasites per 1,000 red cells in a Romanowsky-stained thin film, and a total red cell count. *Norman White*

MORALES, A. B., ORTIZ, A. L. & GARCIA, L. S. **Malaria simulating Acute Appendicitis.** *J. Philippine Med. Ass.* 1949, Mar., v. 25, No. 3, 135–40.

After removing normal appendices from two patients with symptoms of acute appendicitis who later responded to antimalarial therapy, the authors adopted a more critical attitude towards patients with a diagnosis of appendicitis in malarious countries. They report six cases in which a diagnosis of acute appendicitis was either considered or made, but in which further investigation revealed a malaria infection as the cause of the symptoms.

In all six patients, the localizing symptoms, pain and tenderness in the right iliac region, occurred after several days of malaise, fever and sometimes vomiting. This fact and the finding of a normal or low leucocyte count led the authors to suspect malaria which was confirmed by the finding of malaria parasites in the peripheral blood in each case. The infecting parasite was *Plasmodium falciparum* in five cases and *P. vivax* in one.

The authors consider that the cause of the symptoms is the blocking of the capillaries of the mucosa and villi, and they discuss the course of the nerve impulses set up locally in the appendix and caecum by this protozoal infection.
L. E. Napier

COLUZZI, A. Malaria congenita. [**Congenital Malaria.**] *Riv. di Malariologia.* 1948, Dec., v. 27, No. 6, 255–9. English summary (6 lines).

During a period of nine years the author has observed 14 women who had clinical attacks of malaria before, during and after parturition. Eleven had *P. vivax* infections, three *P. falciparum.* None of the three infants born of mothers with *P. falciparum* infection showed any signs of malaria. Five of the 11 infants born of mothers with *P. vivax* malaria developed the disease very soon after birth—two within 40 hours, one on the fourth day, one on the fifth day and one on the seventh day. The infections in all five infants were very readily cured with very small doses of quinine. None suffered from relapse during a period of observation of more than a year. The cures were possibly spontaneous by reason of immunity acquired during gestation.
Norman White

CSEH FIRTOS, S. Malaria tertiana in de Psychiatrische Inrichting te Franeker (1929–1948). [**Tertian Malaria among Psychiatric In-Patients at Franeker, 1929–48.**] *Nederl. Tijdschr. v. Geneesk.* 1949, July 2, v. 93 (iii), No. 27, 2222–30. 1 graph. [13 refs.] English summary (8 lines).

Since the beginning of the century, tertian malaria has been prevalent among the psychiatric patients at Franeker in the northern part of the Netherlands. Between 1929 and 1948 1,326 patients were affected. There were 434 relapses in 334 patients. Numbers affected remained fairly constant up to 1942 when there was a sharp rise lasting until 1946, in which year 38·7 per cent. of the patients were affected. In 1947 the rate fell to 9·7 and in 1948 to 3·1 per cent. It was noted that an autumn peak constantly preceded a higher rate the following spring.

Clinically, cases were recorded in which onset of exacerbation of psychiatric symptoms coincided with an attack of malaria, often undiagnosed. In some cases, however, an attack of malaria was associated with an improvement in the psychiatric condition.

Various forms of treatment were employed. Quinine sulphate, 1 gm. daily for seven or 14 days, resulted in 49·2 per cent. of relapses. With atebrin [mepacrine], three tablets daily for seven days, there were 39·3 per cent. of relapses and two cases showed psychotic symptoms. The majority of patients received " chinoplasmine ", three tablets daily for 7, 14 or 21 days, giving relapse rates respectively of 52, 9·7 and 1·7 per cent. There were a number of complications, including various cardiac side-effects, few of them serious and mostly associated with pre-existing cardiac damage.

The most satisfactory therapeutic agent was " Kiniplex ", a Dutch preparation containing 150 mgm. quinine sulphate and 9 mgm. pamaquin per tablet. With a dose of six tablets a day for 14 days there were no relapses at all in 51 patients treated and no complications or side-effects.

A. L. Winner

Brounst, G. Présence de *Plasmodium ovale* à Beyrouth (Liban). [**Presence of *Plasmodium ovale* in Beirut (Lebanon).**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 257–9.

A case of *Plasmodium ovale* malaria is described from Beirut, Lebanon. A female child was brought for examination and was found to be ill-nourished and anaemic, and to have enlargement of the liver and spleen. Numerous schizonts of *Plasmodium ovale* were present in the blood. Treatment with quinine for three days followed by mepacrine for five days cured the child whose general condition was much improved. The parasites were diagnosed by examination of drops of blood stained with Giemsa's stain ; they were in the stage of large schizonts, surrounded by Schüffner's dots, visible in spite of the loss of haemoglobin in the thick drop, and were said to be very typical of this species.

[The diagnosis of *Plasmodium ovale* in a thick drop from a locality where the infection has not been reported before is open to some criticism ; even well-stained thin films are not always easy to diagnose. The parasites were stated to be oval in this infection—it is usually thought that a crucial diagnostic feature of *Plasmodium ovale* is the *round* parasite in an *oval* erythrocyte. The author states himself that ovale malaria is extremely benign, and yet this case presented symptoms of some severity which were ameliorated by antimalarial treatment.] *P. C. C. Garnham*

Cooper, W. C. **Summary of Antimalarial Drugs.** *Pub. Health Rep.* Wash. 1949, June 10, v. 64, No. 23, 717–32. [101 refs.]

This short article on antimalarial drugs contains no new information but has been written in an attempt to clarify the confusion, which the author rightly believes to exist in the medical literature, with respect to those substances synthesized in the last few years. At different times they have been referred to by a number, synonym or under a proprietary name. All the compounds dealt with namely, quinine, totaquine, quinacrine [mepacrine], chloroquine, oxychloroquine, sontochin, camoquin, paludrine [proguanil], pamaquin, pentaquine and isopentaquine have received mention in this *Bulletin* with, as a rule, some synonyms in brackets. In the case of quinacrine no fewer than twelve additional names are mentioned in the present article. Constitutional formulae, dosage both therapeutic and suppressive, synonyms, behaviour in

the body, activity and indications for use, are briefly described. For the treatment of acute attacks of malaria the author states that quinine, quinacrine, chloroquine or other 4-aminoquinolines or paludrine are adequate. He believes that for this purpose chloroquine is the drug of choice and like paludrine is a good suppressant. For relapsing benign tertian infections the value of quinine in combination with one of the above 8-aminoquinolines is recognized.

J. D. Fulton

FIELD, J. W. **Modern Anti-Malaria Drugs.** *Med. J. Malaya.* 1949, Mar., v. 3, No. 3, 173–90, 8 figs. [33 refs.]

This summary of the characteristics of some of the synthetic anti-malaria drugs that have proved their worth should be of great value to practitioners and malaria workers who have not ready access to the vast literature dealing with the subject. The drugs dealt with are atebrin [mepacrine], paludrine [proguanil], chloroquine, sontochin, plasmoquine, pentaquine, camoquin and metachloridine. The chemical structure of each of these remedies is graphically described as is their mode of action, therapeutic and suppressive dosage, elimination and toxicity. The full list of synonyms of each of these drugs is particularly useful. The relative costs of treating an acute attack of *falciparum* malaria with quinine, atebrin, paludrine, and chloroquine, for seven days, respectively, are illustrated in graphic form, as are the costs of suppression with these drugs, per person per year. The comparison is based on present wholesale prices in Malaya.

An addendum summarizes some recent reports on paludrine-resistant strains of *P. falciparum*. Such strains have not yet been reported in Malaya. For the treatment of attacks of *P. falciparum* malaria, 300 mgm. of paludrine daily for 7–10 days are recommended, reinforced on the first day only with 600 mgm. of atebrin, in two doses of 300 mgm., or with 2 gm. of quinine in divided doses.

Norman White

BLACK, R. H. **Observations on the Treatment of Falciparum Malaria.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, May, v. 42, No. 6, 565–8, 6 figs. on pl. and 1 chart. [13 refs.]

The object of this short paper was " to outline a rational view of the specific treatment of falciparum infections in the light of our present knowledge of the mode of action of antimalarial drugs."

Intravenous injection of paludrine [proguanil] has been used for the treatment of cerebral malaria. Paludrine acts upon trophozoites only at the stage of earliest chromatin division. In cerebral malaria parasites anchored within the cerebral capillaries are in the later stages of development; much time will be lost if paludrine is the only drug used in the treatment of such a case.

Quinine and atebrin [mepacrine] arrest the development of *P. falciparum* early in the schizogonous cycle. Quinine should be used in the treatment of cerebral malaria as well as in heavy infections with *P. falciparum*. The strains of the species of parasites of both human and bird malaria differ among themselves in their response to antimalarial drugs.

The best treatment for a good therapeutic response in severe *falciparum* infections is the intravenous injection of 10 grains of quinine bihydrochloride in solution, given over a period of 10 minutes. This should be followed by oral paludrine. In debilitated patients with thiamin deficiency the intravenous injection may have to be given more slowly, by drip infusion, for example.

Norman White

FAIRLEY, N. H. **The Efficacy of Paludrine (Proguanil) as a Therapeutic Agent. (West African and New Guinea Strains of *Plasmodium falciparum*.)** [Correspondence.] *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, May, v. 42, No. 6, 623–6.

COVELL, NICOL, SHUTE and MARYON recently reported failure to cure patients infected with a West African strain of *P. falciparum* with a single course of paludrine [proguanil] [this *Bulletin*, 1949, v. 46, 703]. They suggested that the high rate of radical cure obtained with paludrine by FAIRLEY *et al.* at Cairns may have been due to delayed treatment. In the Cairns experiments, however, paludrine treatment was instituted at various intervals after exposure to infection, from the time sporozoites first entered the blood on the seventh day till several weeks after the onset of overt malaria. The author thinks that delayed treatment, with development of partial immunity, was not responsible for the radical cure obtained. The extreme sensitivity of the New Guinea strains of *P. falciparum* to the schizonticidal action of paludrine was shown by the facts that : a single dose of 100 mgm. paludrine often resulted in clinical cure and the temporary disappearance of asexual parasites in non-immune volunteers ; a high incidence of radical cure was obtained in both natural and experimental infections by the administration of 0·1 gm. paludrine thrice daily for 10 days ; asexual erythrocytic parasites disappeared from the blood during such a course of treatment in 2·1 to 2·35 days.

The discordant results must be attributed to differences between two distinct geographical strains of *P. falciparum*. New Guinea is situated well within Wallace's line, so perhaps it is not surprising that its strains of plasmodia have special characteristics. *Norman White*

RUHE, D. S., COOPER, W. C., COATNEY, G. R. & JOSEPHSON, E. S. **Studies in Human Malaria. XII. The Protective and Therapeutic Action of SN 5241 against St. Elizabeth Strain Vivax Malaria.** *Amer. J. Hyg.* 1949, May, v. 49, No. 3, 346–54, 6 figs.

SN 5241 is α-(dinonylamino-methyl)-1,2,3,4-tetrahydro-9-phenanthrene-methanol. It is a close analogue of NIH-204 (SN 1796) which was found to have insufficient antimalarial activity [this *Bulletin*, 1948, v. 45, 147, 150].

Twenty-one prisoner volunteers were the subjects of this inquiry ; they were infected by the bites of *Anopheles quadrimaculatus* with the St. Elizabeth strain of *P. vivax*. SN 5241 hydrochloride was given in capsules each containing 0·25 gm. of base. The usual dose was 1·5 gm. a day. The drug was shown to have antimalarial activity, but its action is slow. It does not permanently prevent or cure *vivax* malaria. During 18 courses of therapy two patients developed severe maculo-papular skin reactions and a third had mild urticaria. Two of 10 subjects undergoing protective tests also developed skin reactions. It did not produce the undesirable side-effects that SN 1796 does but the high incidence of cutaneous reactions precludes its routine use. *Norman White*

COOPER, W. C., RUHE, D. S., COATNEY, G. R. & JOSEPHSON, E. S. **Studies in Human Malaria. XIII. The Therapeutic Action of Metachloridine (SN 11,437) against St. Elizabeth Strain Vivax Malaria.** *Amer. J. Hyg.* 1949, May, v. 49, No. 3, 355–60, 2 figs. [15 refs.]

This records the attempted cure of 10 prisoner volunteers who had been infected with the St. Elizabeth strain of *P. vivax* by mosquito bite. They were all treated during late attacks, occurring more than six months after infection.

Their early attacks had been suppressed by either quinacrine [mepacrine], sontochin or chloroquine. Blood smears were examined at least once weekly until 18 months after original exposure to infected mosquitoes.

SN 11,437 (metachloridine), a sulphonamide, was administered in capsules each containing either 0·25 or 0·5 gm. of the drug. Five patients were treated with SN 11,437 alone. For delayed primary attacks the dosage was 0·5 gm. every six hours for 12 days. In the treatment of second or third attacks the dosage was raised to 4·0 gm. a day ; sodium bicarbonate was given concurrently with the larger doses, and doses were at times reduced so as to maintain plasma concentrations at about 14 mgm. per 100 ml. There was slow clearance of patent parasitaemia, average 6·2 days : subsidence of fever averaged 3 days. Relapses occurred after 3 of 5 initial late attacks and after one of 3 second late attacks ; parasites reappeared in the blood 22 to 58 days after the end of treatment. One patient on the third day of the second course developed a petechial rash of the lower limbs.

In a second series of five cases the SN 11,437, in doses as above, was reinforced with 2·0 gm. of quinine sulphate a day. The response was what might have been expected from quinine alone. Relapses occurred after all five of the initial courses of treatment, at intervals of from 31 to 46 days. No further activity followed second courses. One of these patients also developed a purpuric rash on both legs during the second course.

" It may be concluded that SN 11,437 has serious deficiencies which make it unlikely that it will become a generally useful antimalarial."

Norman White

RUHE, D. S., COOPER, W. C., COATNEY, G. R. & JOSEPHSON, E. S. **Studies in Human Malaria. XIV. The Ineffectiveness of Colchicine (SN 12,080), SN 7266 and SN 8557 as Curative Agents against St. Elizabeth Strain Vivax Malaria.** *Amer. J. Hyg.* 1949, May, v. 49, No. 3, 361–6, 3 figs. [13 refs.]

Colchicine (SN 12,080), SN 7266 (the ethyl ester of *p*-guanylbenzoic acid) and SN 8557 (2-[3-(decahydro-2-naphthyl)propyl]-3-hydroxy-1,4-naphthoquinone) all failed to prevent relapses when administered after quinine sulphate treatment of attacks of St. Elizabeth strain *P. vivax* malaria.

Norman White

RUHE, D. S., COOPER, W. C., COATNEY, G. R. & JOSEPHSON, E. S. **Studies in Human Malaria. XV. The Therapeutic Action of Pamaquine (Plasmochin) against St. Elizabeth Strain Vivax Malaria.** *Amer. J. Hyg.* 1949, May, v. 49, No. 3, 367–73, 1 fig. [19 refs.]

Twenty-three subjects with late primary attacks of *P. vivax* malaria, St. Elizabeth strain, were treated with pamaquin naphthoate and quinine sulphate. Relapse was observed in one patient out of four who had had 0·06 gm. (base) of pamaquin a day for six days after a six-days course of quinine sulphate, 2·0 gm. a day. No relapse occurred among 19 patients who were given 0·03, 0·06 or 0·09 gm. (base) of pamaquin a day concurrently with 2 gm. of quinine sulphate a day for 12 days. These results contrast with an overall relapse rate of 80 per cent. when late primary attacks of this strain of *P. vivax* are treated with non-curative drugs such as quinine, quinacrine [mepacrine], chloroquine, sontochin or metachloridine. *Norman White*

GARCIA, E. Y. **The Inhibition of Malarial Relapses by Toxoid of** *Clostridium tetani*. Reprinted from *Ann. New York Acad. Sci.* 1948, June 7, v. 50, Art. 3, 171–86, 4 figs.

A chance observation of a remarkable case prompted the investigation described in this paper. A mental patient undergoing malaria therapy in the

U.S.A. developed gas gangrene, a *Clostridium welchii* infection. The *P. vivax* parasitaemia disappeared spontaneously the day after the onset of gangrene, and malaria parasites did not reappear. When the author returned to the Philippines he decided to ascertain whether the allied tetanus toxoid possessed any antimalarial activity.

Three hundred and nineteen patients suffering from malaria were treated and observed for 330 days. They all received a basic treatment which consisted of an intramuscular injection of 0·10 gm. atebrin [mepacrine] followed by the oral administration of either 2·1 gm. atebrin or 3·5 gm. chloroquine during a period of seven days. Sixty-five of these patients, 40 with *P. vivax* and 25 with *P. falciparum* infections, received no further treatment. Thirty-six, 90 per cent., of the *P. vivax* patients had parasite relapses, as had 21, 82 per cent., of the *P. falciparum* patients. The average interval to relapse was 115 days.

The remaining 254 patients (193 *P. vivax*, 61 *P. falciparum*) each received, at the end of their basic treatment, a subcutaneous injection of 1 cc. tetanus toxoid in the deltoid region : this was repeated three weeks later. None of the *P. falciparum* and only 15 (7·7 per cent.) of the *P. vivax* patients so treated had a parasite relapse. The average interval to relapse was 315 days. The author suggests that the toxoid stimulates the phagocytic activity of reticulo-endothelial cells. *Norman White*

GARNHAM, P. C. C. **Malarial Immunity in Africans : Effects in Infancy and Early Childhood.** *Ann. Trop. Med. & Parasit.* 1949, Apr., v. 43, No. 1, 47–61, 2 text figs. & 2 figs. on pl. [33 refs.]

Most of the observations recorded relate to a single African tribe, the Luo, living around the Kavirondo gulf of Lake Victoria, East Africa, a highly malarious region.

Congenital malaria was not observed among 146 infants born of mothers infected with malaria, with one possible exception, a case of *P. malariae* infection, which is described. Malarial infection rarely resulted in still-birth or in the death of the infant during the first week of life. The Luo infants are born free from malaria parasites and are unlikely to suffer ill effects from infection in the mother. From a third to a half of Luo children are likely to acquire *P. falciparum* infection during the first six months of life ; all are infected during the first year. A quarter of the infants acquire *P. malariae* infection during the first six months, and nearly all during the first three years of life. The incidence of *P. vivax* infection is patchy. The parasite rate during the first two months of life was only 10 per cent. ; this low rate is possibly explained by transmitted passive immunity.

Malaria among these children was clinically a mild disease ; only 10 per cent. of cases were severe. The temperature rarely rose above 100°F. ; convulsions were rare.

Seventy-five children were examined periodically for two years with special reference to the effect of the malaria infection. It caused little deterioration of general physique. Fever was slight and unaccompanied by convulsions. The normal increase in weight was uninterrupted during the first attack of malaria in a third of the children ; in the remainder the weight remained stationary or there was a slight loss. The red-cell count was lowered by 13 per cent. during the first attack but after five months of continued malaria infection the count had returned to normal. Six of the children died, only one from malaria. Each child received only 30 to 60 grains of quinine throughout the whole two years.

Post-mortem examinations were made of 52 infants whose blood had shown malaria parasites and who would normally have been certified as having died from malaria. Malaria was the cause of death of only 17 of the 52. Meningitis, pneumonia and gastro-enteritis were among the causes of death of the others. Malaria in infants is characterized by an unusually massive lymphoid-macrophage response to the infection. In the liver the proliferation and swelling of the Kupffer cells is excessive. The blood-vessels are engorged with lymphoid-macrophage cells in all stages of development. Throughout the body the swollen and proliferated endothelium interferes with the blood supply as much as do clumped parasitized erythrocytes.

No evidence of exoerythrocytic schizogony was found in brain, heart, liver or spleen.

Malaria in early childhood must be studied against a background of immunity—phylogenetic, transmitted passive, and acquired immunity.

Norman White

GARNHAM, P. C. C. **Modern Concepts in Malaria Control.** *J. Roy. San. Inst.* 1949, Sept., v. 69, No. 5, 617–25. [30 refs.]

The modern insecticides have transformed the situation in regard to malaria control, but they have not made the older methods obsolete, and it is still wise to drain swamps and trim streams. Nevertheless, the insecticides have made possible programmes of control or eradication which would have seemed impossible by the older methods. The author gives an interesting account of his own work on the control of epidemic malaria in the Kenya highlands, where *Anopheles gambiae* transmits the disease seasonally. The use of DDT in the houses of an African population of 10,000, in a tract of country covering 60 square miles at 6,000 feet, was responsible for a distinct fall in parasite rates and an even more impressive fall in numbers of *A. gambiae* caught in houses. Comparisons were made with neighbouring untreated areas, which, unlike the treated country, were swept by malaria. A more clear-cut result would probably be obtained if a bigger tract were treated.

The author writes very favourably of dimethyl phthalate as a repellent.

Garnham discusses, in a very brief section, the subject of immunity [when he writes " it is difficult to underestimate the importance of immunity in, say, tropical Africa", one knows what he means]. In the hyperendemic areas of Africa the adults do not suffer from malarial fever, and the children and infants show little evidence of its effect. The death rate from malaria of infants has probably been much exaggerated; the author performed post-mortem examinations on 52 infants [*of immune tribes*], all supposed to have died of malaria, but he found that this was the true cause of death in only 17, the rest having died of undiagnosed meningitis, pneumonia, etc. [see also GARNHAM, above]. Garnham then postulates the effect of incomplete control in a hyperendemic area; infection would be reduced to perhaps one or two infective bites per annum, instead of hundreds, and the result would be gradual loss of immunity and, if control were subsequently slackened, a devastating epidemic of malaria might occur. [This kind of event has been postulated before, but the reader may ask whether it has, in fact, actually happened. Garnham has elsewhere stated that if the infants and children in a community do not suffer severely from malaria, it may be because of an in-born immunity, not merely a passive immunity derived from their mothers during the first few months of life. If this is true it is not easy to foresee how devastating an epidemic would be. Constant infection no doubt creates the state of premunition, but it does so in people already considerably endowed with in-born resistance. In time, of course, the reduction of infection would

permit survival of less immune individuals, and the community as a whole would become more susceptible to the disease, but this process might be very slow.]

The author makes the point that in hyperendemic areas it would be advisable to consider whether large sums of money could be more usefully employed on the provision of water, prevention of soil erosion, and other measures, rather than on malaria control. He advocates further research into the alleged grave effects of the disease in hyperendemic areas. [The reviewer entirely agrees that this research is needed. He also thinks that an experiment is needed to discover just what will happen if incomplete control is established in a hyperendemic area.] *Charles Wilcocks*

Ciuca, M., Alexa, I., Duport, M. & Athanasiu, M. Efficacité et limites de la chimiothérapie dans un programme systématique de lutte antipaludique. Recherches effectuées au cours d'une épidémie fulminante à *P. falciparum*. [**Efficacity and Limitations of Chemotherapy in a Systematic Anti-Malaria Campaign : Research undertaken during a Violent** *P. falciparum* **Epidemic.**] *Arch. Roumaines Path. Expér. et Microbiol.* 1948, v. 15, Nos. 1/2, 199–224, 15 figs. & 7 graphs (4 folding).

Disorganization occasioned by war was in part responsible for a very serious epidemic of malaria in the Tulcea District of Rumania. The Tulcea District lies between the lower reaches of the Danube and the Black Sea coast. It has a population of about 120,000. *Anopheles elutus* [*sacharovi*] and *A. maculipennis atroparvus* are both prevalent. Malaria endemicity was high in 1939. Epidemic outbreaks occurred in 1940–1942 as the result of the colonization of non-immune settlers, without adequate protection. The *P. falciparum* epidemic afflicted the immigrant and indigenous populations alike. In 1938, 82 per cent. of positive blood films contained *P. vivax*, 17 per cent. *P. falciparum* (8,300 examined). In 1946, 12 per cent. were *P. vivax*, 84 per cent. *P. falciparum*, and 3·4 per cent. *P. malariae* (16,011 films examined). The malaria death rate in 1946 was 210 per 100,000.

The organization set up to combat the deplorable health conditions that the epidemic had brought to light comprised a polyvalent Health Centre in the town of Tulcea in constant liaison with 36 rural health centres, newly created ; a mobile dispensary containing a diagnostic laboratory ; 2 antimalaria stations, and a malaria diagnostic and treatment centre at Isaccea. The Tulcea Hospital and rural district hospitals gave medical assistance. The medical staff included 12 health officers, 8 specialists, 1 bacteriologist, 2 entomologists, 41 health visitors, 15 midwives, 24 sanitary inspectors, and 20 drug distributors. Voluntary organizations also rendered assistance, notably the Rumanian Red Cross Society who provided 23 additional nurses and antimalarial drugs received from the League of Red Cross Societies. The effort achieved remarkable success as evidenced by the vital statistics that are produced. The infant mortality rate during the first half of 1948 was 60 per cent. lower than in the corresponding half of the previous year.

In 1943, *A. m. atroparvus* and *A. sacharovi* were prevalent along the coast and *A. m. messeae* was predominant in freshwater breeding places in the Danube Valley and in the north-west of the district. In *A. sacharovi* areas the infection rate (sporozoites and oöcysts) averaged 2·64 per cent. *A. sacharovi* was found for the first time in the Danube Delta at Sulina in 1948 ; the extension of this species in the delta might have grave consequences.

The height of the malaria epidemic was in the autumn of 1946 : in October of that year some 15,500 cases were recorded and the monthly incidence continued above 13,500 for the rest of that year. A constant decline in incidence

did not occur till October, 1947, consequent upon the systematic treatment of patients and parasite carriers. The treatment consisted of seven days atebrin [mepacrine] or its equivalent followed, after an interval, by five days of plasmoquine. It is estimated that 90 per cent. of new patients and those with relapses were so treated. After 18 months of such treatment epidemic waves were suppressed ; malaria mortality was reduced by 95 per cent. and endemic indices by 66 per cent. : the proportion of *P. falciparum* infections fell to 25 per cent., a normal proportion for Rumania.

The authors insist, however, that, in the circumstances prevailing, drug treatment is not enough ; they recommend in addition the spraying of dwellings with a residual insecticide in regions of such high anopheline density. A small experiment with DDT spraying has been made, with promising results.

Norman White

WALLACE, R. B. **Mass Suppression with Chloroquine ; Chloroquine and Pentaquine ; and Neo-Premaline.** *J. Trop. Med. & Hyg.* 1949, May, v. 52, No. 5, 93–106, 6 charts & 3 maps.

The experiments described were carried out on a rubber estate in Malaya of over 10,000 acres. Surrounded on three sides by jungle-covered hills, it is typical *A. maculatus* country with ravines, seepages, streams and drains with clear running water. All the eight divisions of the estate are malarious, some hyperendemic. Before Japan entered the war, anti-larval measures were carried out under strict control but did not prevent the seasonal epidemics of malaria that occurred with unfailing regularity. Suppressive treatment with atebrin [now mepacrine] was tried in the worst malarial divisions from 1932 onwards, and continued until the war with Japan : it proved to be the most effective measure of control so far tried in that area. Now mass suppression of malaria with drugs is the only control measure used : it is more effective and cheaper than antilarval measures in this particular area. The latter never prevented seasonal epidemics ; atebrin did. The newer insecticides are now on trial, however.

The experiments described were largely confined to Indian members of the mixed population : they are more amenable to discipline and take drugs more readily than the Malays, Chinese and Javanese. The population of each division was divided into two groups, X and Y ; Group X was given the new drug, Group Y a harmless placebo. The year 1948 was an unfortunate one for the experiment. The early high prevalence of *A. maculatus* indicated a severe malaria epidemic to follow, but unusual high storms that lasted a fortnight occurred when the *A. maculatus* curve was at its height and caused a rapid fall in the prevalence of the vector. No malaria epidemic ensued, except in one area in which chloroquine was being tried. There was an unusual and unexpected increase in malaria prevalence in July–August.

Chloroquine diphosphate tablets were used, each of 0·25 gm. (containing 0·15 gm. base). They were given once a week, the dose varying from one-tenth of a tablet for infants under six months to two tablets for ages 14 years and over. There were 100 persons in Group X and 53 in Group Y. The drug was given from March 2nd to June 1st. There was complete protection for the group on suppression. There were no toxic effects. During April 40 per cent. of the control group were admitted to hospital for malaria. Thereafter the control group also received chloroquine. Most of the cases that occurred in June, July and August were from the original control group. When atebrin was used as a prophylactic there was always a marked rise in the malaria rate some three weeks after medication ceased. After chloroquine there were only three cases in the first month, one subtertian and two benign tertian.

Chloroquine and pentaquine were given in tablets, each containing 0·15 gm. chloroquine base and 0·015 gm. pentaquine base : the dosage was the same as for chloroquine [these doses are given in terms of base only]. Group X contained 158 and Group Y 137 persons. The drugs were given from March 2nd to June 1st and from July 30th to October 1st. In this area the expected epidemic did not materialize ; there were no cases in May. In June and July when an unusual wave of malaria occurred there were 1 and 19 cases in Group X, and 12 and 20 in Group Y. At the end of July both groups received treatment ; all available labour was then needed.

The test was not a severe one, but chloroquine and pentaquine gave complete protection. In April there were seven cases in the control group and none in Group X. The fall in malaria incidence in August was remarkable ; only one case occurred. There was no case in September among the treated ; among the Malays there was a 5 per cent. incidence. There were no toxic effects of any importance.

Neo-Premaline was given in tablets, in the case of two divisions. Each tablet contained chloroquine base 0·15 gm., pamaquin base 0·0075 gm., and rhodoquine base 0·0075 gm. [doses given in terms of base only]. The dosage was the same as for other drugs. In Division H Group X contained 123 and Group Y 109 persons. The drugs were given from March 17th to June 30th. In April the malaria rate was 6 per cent. in the control group : there was no case in the treated group. During the whole period there were 19 cases from Group Y, one from Group X. The parasite rate in Group X fell from 7 per cent. to nil. In the control group it rose to 20 per cent. then gradually fell to 5 per cent. in June as the malaria wave receded. There were no toxic effects from the drugs.

The results obtained with all three drugs were impressive and warrant further trial. *Norman White*

CHWATT, L. J. *Anopheles gambiae melas* **Control by Swamp Drainage in a Coastal Zone of Nigeria, British West Africa.** *Mosquito News.* 1949, June, v. 9, No. 2, 56–68, 4 figs. [15 refs.]

Coastal swamp drainage as a means of permanent control of the breeding places of *Anopheles melas* was carried out by Dr. A. B. GILROY between 1942 and 1947 at Lagos in Nigeria and is fully described in his monograph " Malaria Control by Coastal Swamp Drainage " [this *Bulletin*, 1948, v. 45, 1043]. The author of the paper under review reiterates these methods and tabulates annual results till 1947 in terms of average *Anopheles* density index (*melas* only) in two typical zones ; contrasting figures of daily anopheline larvae collections per acre of water surface in drained and undrained swamps are quoted, *e.g.*, 28·4 : 1,734·8.

By the end of 1946, approximately 20 miles of embankment had been constructed to exclude sea-water from a total swamp area of 4,195 acres ; associated " internal " drainage amounted to a length of 130 miles and 21 sluice gates were necessary. By this means the town and harbour works of Lagos (pop. 200,000) have been almost cleared of *Anopheles melas* as evidenced by a fall in average *Anopheles* density in the port zone from 47 *melas* per room in 1942 to 2·2 for the worst quarter of 1947. Contrary to expectations, little breeding of *melas* occurs in the drains ; larvae may be found in pools caused by temporary obstruction ; over 50 per cent. of larvae are first or second instar, and pupae are rare ; cyclical rise and fall of water level and the presence of larvivorous fish are important factors. Constant vigilance by the Government Malaria Unit is essential.

The author categorically rules out the use of residual insecticide (DDT) as a sole measure of control of *Anopheles melas* under these conditions because " there are only few human habitations within or in the vicinity of the main breeding area." The value of reclaimed land is an important side issue. The author believes the results attained in the Lagos area justify the use of coastal swamp drainage even though more modern methods of control are available. *R. Ford Tredre*

Lindberg, K. Crustacés copépodes comme ennemis naturels de larves d'anophèles. [**Copepods as Natural Enemies of Anopheline Larvae.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 178–9.

Nair, C. P. **Investigation on DDT Barrier Spray in Multiple Vector Areas in Malaya.** *Med. J. Malaya.* 1949, June, v. 3, No. 4, 250–58.

In 1945 in the township and outskirts of Klang four sites, each of which included a control, were selected to test the residual action of 5 per cent. DDT in kerosene on the local malaria vectors, *A. maculatus*, *A. letifer* and *A. sundaicus*. On the first occasion spray was applied in atomized form to the interior of dwellings, to the outer surfaces of walls and to vegetation, etc., covering a surrounding zone fifty yards in width measured from the perimeter of the site. Interior space spraying was not included in subsequent sprayings and the later sprayings towards the end of the four-month test period were applied to the protective 50-yard barrier only. The quantity of spray used per acre on any one site remained the same irrespective of the surfaces treated and was approximately five gallons. Early in the test period the appearance of any mosquitoes was the signal for re-spraying but subsequently the occurrence of anophelines only was followed by a repeat treatment. From his observations the author concludes that the period after spraying for a build-up of mosquitoes to 10 per cent. of normal population is 10 days on the outskirts and 12 days in the town, or for anophelines 13 and 15 days respectively. Return to normal of the general mosquito population occurred after six weeks. The best results were obtained by the barrier spray only without the use of any of the fixed quantities of insecticide in treatment of the dwellings.

[From the tabulated data the reviewer finds the above-quoted assessment of results difficult to follow.] *R. Ford Tredre*

Tetzlaff, F. **Malaria Control Progress and Problems.** *J. National Malaria Soc.* 1949, June, v. 8, No. 2, 115–20, 3 figs.

The programme for the elimination of malaria from the U.S.A. within the five years beginning in 1947 depends on Federal and State participation. There has been a steady increase in State activities which now makes their contribution about equal to that of the Federal authorities. As a result of this and the favourable progress of the campaign it has been possible to modify the criteria on which areas are considered malarious and requiring treatment, making them much more stringent than before.

In 1948 the number of houses treated was 1,374,766, the usual treatment being a single season application of DDT at a rate of approximately 200 mgm. per sq. ft. (7 oz. per 1,000 sq. ft.) of wall and ceiling surfaces in homes, on the back and insides of furniture, on front and back porches and in privies. *A. quadrimaculatus* are now found in 2·8 per cent. of sprayed houses which compares with 1·0 and 2·1 per cent. in 1946 and 1947 when more frequent treatments were given. The number of cases of malaria is not stated.

There have been complaints that fly control has not been as satisfactory as in previous years, which is explained partly by fly resistance and partly by the manner in which refuse is handled and possibly by unsatisfactory DDT concentrates. This is regretted because fly control is an important means of securing local co-operation.

A number of alternative insecticides have been tried out, but DDT as it is now being used is still the most effective and most economical one available.

G. Macdonald

Gahan, J. B., Downs, W. G. & Celis, H. **Control of *Anopheles pseudopunctipennis* in Mexico with DDT Residual Sprays applied in Buildings. Part II.** *Amer. J. Hyg.* 1949, May, v. 49, No. 3, 285–9.

In a previous paper [this *Bulletin*, 1947, v. 44, 880] encouraging entomological results were recorded in the initial stages of the use of residual sprays (1945) in villages in Mexico where the vector of malaria, *A. pseudopunctipennis* breeds in rice-fields. The application of DDT either in emulsion or wettable powder form was continued through 1946, 1947 and 1948, and when checked the dosage was 238 milligrammes per square foot. Internal wall and roof surfaces of all dwellings and other buildings were treated once each year. Adult mosquitoes collected in houses have been reduced to very small numbers (*e.g.*, 92 to 0·5 per house), but this method of checking offers little proof of lethal effect ; mosquitoes are seldom found dead in buildings, suggesting that they leave after contact with a lethal surface. Special emphasis was therefore attached to estimation of larval abundance in the rice-field. Average counts of *Anopheles* larvae obtained by dipping are tabulated for each month of the three years 1945, 1946 and 1947, the counts having been made on approximately the same date each year : for example at one village untreated in 1945 the average number of larvae per dip for all observations in 1945, 1946 and 1947, were 3·44, 0·61, and 0·28 respectively. It is evident that the DDT applications did not kill enough adult mosquitoes to reduce the breeding in the surrounding rice-fields, but the continued presence of larvae after three years of residual insecticide application does not suggest that this sole method of control will eventually eradicate *A. pseudopunctipennis* from these localities. Laboratory tests were carried out to determine whether resistant strains of anophelines had developed after four annual sprayings ; there was no evidence of such strains. The effect of this work on malaria incidence is to be reported later.

R. Ford Tredre

Giglioli, G. **Mosquito Eradication.** [Correspondence.] *Brit. Med. J.* 1949, Sept. 10, 595.

Dr. Giglioli, in reference to a leading article in the *Brit. Med. J.*, 1949, July 23, 222, on mosquito eradication, gives a salutary reminder that measures of malaria control, whether by means of residual insecticides or by older methods, cannot be effective or economically sound unless they are applied with an intelligent knowledge of local epidemiological conditions. Especially important is the study of the bionomics of the local vectors : results obtained in Cyprus, Sardinia and British Guiana are cited to show that their significance is strictly limited to the local vector and ecology.

With the use of residual spraying methods, a knowledge of breeding habits is not enough : the feeding, biting and resting habits of the adult insects must be thoroughly understood. Anthropophilic and domestic species (*e.g.*, *Anopheles darlingi* and *Aëdes aegypti*) are specifically vulnerable to residual techniques and have been eradicated by these methods alone in settled areas of British Guiana, under a wide range of environmental conditions which are fairly typical of a large part of tropical South America. On the other hand, mosquitoes which bite in the open and do not enter houses, such as *A. bellator* in bromelias in Trinidad,

can be expected to be as refractory to residual spraying as they are to conventional hydrological control.

Between these extremes are species which are only partly domestic and anthropo-zoophilic in their biting habits, *e.g.*, *A. albimanus* and *A. aquasalis*. With these, residual methods only give partial results; those mosquitoes actually entering houses can be eliminated, and malaria transmission thereby reduced, but the total species population will hardly be affected. Residual house-spraying has had no effect whatever on the population of *A. aquasalis* in British Guiana.

While localized eradication of *Aëdes aegypti* and *Anopheles darlingi* has been achieved under continental conditions in British Guiana, the possibility of reinvasion remains if periodical application of DDT is not continued indefinitely. Nevertheless, with adequate local topographical and ecological knowledge, spraying operations can be confined to a number of strategic localities, and advantage taken of natural barriers to different species: even under continental conditions, natural obstacles may be found and exploited, through a complete knowledge of the biology of local vectors and local environmental conditions.

The author's main thesis is contained in his wise observation: "Generalizations in the malariological field are no more warranted to-day than they were yesterday, before the introduction of residual insecticides".

H. J. O'D. Burke-Gaffney

DE MELLO, P. J. & PINTO, O. da S. Contribuição à melhoria do equipamento para dedetizações domiciliares. **Improvements in the Methods of Insecticidal Spraying of Houses.** *Rev. Brasileira Malariologia.* Rio de Janeiro. 1949, Apr., v. 1, No. 2, 100–102, 2 figs.

Two improvements in methods of treating houses with residual insecticidal spray are described. (1) For spraying numerous rooms in large buildings it is convenient to use a petrol compressor, which supplies compressed air along a lead to an insecticide container, which is taken into the building (upstairs if necessary). The container is a 30-litre cylinder, which carries 15 litres of DDT solution and a 15-litre air space for compressed air (at 25 lb. per sq. inch). Several leads can be taken off this container, allowing men to operate simultaneously from the same supply. (2) For purposes of estimating quantities of spray required, it is desirable to measure the surface area of rooms to be sprayed. Two simple instruments enable this to be done very rapidly. (*a*) An extensible rule is used to find the height of the ceiling. (*b*) To obtain the perimeter, a wheel of suitable size, fixed in a revolution counter, is run round the walls of the room. The product of perimeter and height give a rough guide to surface area.

J. R. Busvine.

i. DE BUSTAMANTE, F. M., FERREIRA, M. O. & RACHOU, R. G. Da aplicação extradomiciliar de DDT por helicóptero no combate aos anofelinos do subgênero *Kerteszia* em matas primárias com predominância de bromélias epífitas. **Application of DDT and Benzene Hexachloride by Helicopter in the Attack on Anophelines of the Sub-Genus *Kerteszia* in Forests where Epiphytic Bromeliads predominate.** *Rev. Brasileira Malariologia.* Rio de Janeiro. 1949, Apr., v. 1, No. 2, 67–90, 1 graph. [16 refs.]

ii. FERREIRA, M. O., RACHOU, R. G. & DE BUSTAMANTE, F. M. Da aplicação extradomiciliar de hexaclorobenzeno por meio de helicoptero no combate aos anofelinos do sub-gênero *Kerteszia*, em matas primárias com predominância de bromélias epífitas. *Ibid.*, 90–99, 3 figs.

i. In the state of Santa Calarina, malaria is transmitted by Anophelines of the sub-genus *Kerteszia* which breed in the axils of bromeliads. In some areas

where the bromeliads are terrestrial, malaria control can be done by destroying all the plants of this type in the neighbourhood of the towns. But in other districts, the bromeliads are epiphytic, in dense natural forest, and their destruction is very difficult. This paper records attempts to destroy the mosquitoes and the larvae breeding in the bromeliads by dusting DDT over the forest from a helicopter.

A Bell model 47 helicopter was used, weighing 691 kgm. and capable of carrying 130 kgm. of insecticide (or up to 180 kgm. on short flights, by reducing the fuel carried). A 10 per cent. DDT dust called " Gyron " (Geigy Co., Brazil) was employed. Applications were made to two test wooded areas of 100 and 30 hectares respectively.

The effects of treatments were judged by the following observations made before and after treatment in the test woods and in another control wood about 30–40 km. distant :—

(1) Night catching at 4 or 5 human baited traps per wood. This indicated effects on adult mosquitoes.

(2) Larval density per bromeliad was determined by searches at intervals ; and also special observations were made on larvae placed in marked bromeliads shortly before treatment.

The results of applications of 900 gm. DDT per hectare (13 oz./acre) gave a reduction of adults from 92 to 99·8 per cent. (as compared with observations before treatment) for 25 days after application. The effect on larvae was only 77 per cent. reduction at 24 to 48 hours but the numbers subsequently declined owing to the high kill of adults. Treatment with DDT at 1,300 gm. per hectare (19 oz./acre) in another wood gave 90·3 per cent. reduction in adults, reaching 78 to 100 per cent. at 16 days after treatment. The kill of larvae was better, being 94 per cent. (one day) and 98 per cent. (one week) after treatment.

ii. Similar experiments were carried out with *gamma* BHC preparations. A dust " Gamorial " containing 1½ per cent. *gamma* isomer (Duperial Co.) was applied at the rate of 150 gm. active principle per hectare (about 2 oz./acre). This gave a 99·23 per cent. reduction of adult mosquitoes on the second night after treatment. For four days the population of *Kerteszia* remained low but after six days, reinfestation began to be evident. This treatment had no appreciable effect on larvae.

A treatment with "Agrocide " containing 6½ per cent. *gamma* isomer (Duperial Co.) in 10 per cent. aqueous suspension was made at the rate of 156 gm. active principle per hectare. This reduced adult mosquitoes by 86 to 100 per cent. from the second to twelfth day ; but reinfestation began to be appreciable thereafter. Unlike the powder treatment, the "Agrocide " reduced the larvae by 90 per cent. on the third day after treatment.

[The large percentage reductions in the tests reported in these two papers are partly offset by a substantial natural decline over the period of the experiment : *e.g.*, adults captured in the control wood showed a reduction of 23 to 94 per cent. (average 70 per cent.) as compared with the period before treatment.]

J. R. Busvine

Ruskin, A. & Rigdon, R. H. **The Electrocardiogram of Normal and Malaria-Infected Monkeys.** *J. Lab. & Clin. Med.* 1949, Aug., v. 34, No. 8, 1105–8, 1 fig.

" 1. The normal electrocardiogram of the *Macaca mulatta* monkey is between that of the dog and man. The variability includes negativity of the T waves in Leads I, II, and IV F and displacement of the S-T segments from the iso-electric line.

" 2. The electrocardiogram of malaria-infected *Macaca mulatta* monkeys does not differ from that of the controls in the great majority of instances. The rare

exceptions include marked (left) axis deviation and slight prolongation of the Q-T interval. No typically anoxemic electrocardiographic changes were demonstrated, even in monkeys showing red blood cell counts only 25 per cent of normal.

"3. The absence of significant electrocardiographic alterations in monkeys infected with *P. knowlesi* is consistent with the known pathologic changes in malaria in monkeys and with the findings of others in a large series of cases of malaria in human beings."

LLOYD, O. C. & SOMMERVILLE, T. **The Fate of Sporozoites of *Plasmodium cynomolgi* injected into the Skin of *Rhesus* Monkeys.** [Abstract.] *J. Path. & Bact.* 1949, Jan., v. 61, No. 1, 144–6.

This paper summarizes the more important results of an investigation in monkey malaria [see this *Bulletin*, 1947, v. 44, 966]. The details of the work are given in a thesis by the first author for the Cambridge University doctorate of medicine. Mosquitoes infected with *Plasmodium cynomolgi* were ground in monkey serum and injected into the abdominal skin of Rhesus monkeys. Each monkey received two injections simultaneously, the inocula being the product of 50 mosquitoes. At varying periods (minutes, hours and days) the skin at the two sites was excised ; one portion was prepared for section, the other was transplanted in a clean monkey. At similar periods, blood was drawn from the infected animals and inoculated into others. Unlike the results of HUFF and COULSTON's experiments with avian malaria [this *Bulletin*, 1945, v. 42, 538], no local development of the sporozoites was detected. The sporozoites persisted in large numbers for two hours in that part of the skin which had yet to be invaded by inflammatory cells, *viz.* in the central liquid part of the inoculum. By four hours the sporozoites had vanished. The parallel experiments with subinoculated skin and blood confirmed these results—the monkeys developing malaria up to a maximum of two hours after having received these inocula. Subinoculations of blood taken at 20 and 40 minutes after the inoculations gave rise to infections in the recipients, indicating that sporozoites were circulating in the donor's blood during this time. Under the conditions of these experiments it seems unlikely that sporozoites gained an entry into the blood before 20 minutes.

The authors conclude that many sporozoites are killed at the local site, probably by the lytic action of phagocytes ; others escape from the area probably by the lymphatics *via* the thoracic duct to the blood stream. Under natural conditions after the bite of an infected mosquito, the sporozoites may either enter the blood stream directly after penetration of the proboscis into a capillary, or *via* the lymphatic route. In the former case, they will be demonstrable immediately [as in FAIRLEY's work, see this *Bulletin*, 1945, v. 42, 630] ; in the latter not until 20 minutes or so have elapsed (as in these experiments). *P. C. C. Garnham*

TALIAFERRO, W. H. ; KELSEY, F. E. ; TALIAFERRO, Lucy G. **The Role of the Spleen and the Lymphoid-Macrophage System in the Quinine Treatment of Gallinaceum Malaria. I. Acquired Immunity and Phagocytosis** [TALIAFERRO, W. H.]. *J. Infect. Dis.* 1948, Sept.–Oct., v. 83, No. 2, 164–80, 4 figs. **II. Quinine Blood Levels** [TALIAFERRO, W. H. & KELSEY]. *Ibid.*, 181–99, 7 figs. **III. The Action of Quinine and of Immunity on the Parasite** [TALIAFERRO, W. H. & TALIAFERRO, Lucy G.]. *Ibid.* 1949, Mar.–Apr., v. 84, No. 2, 187–220, 10 figs. [Numerous refs.]

I. It is possible that in chemotherapy the importance of the part played by the host in combating infections and producing cures has been underrated.

An active rôle has however been assigned by some authors to certain body cells such as those of the lymphoid-macrophage system which are believed to act in conjunction with drugs. The theories expressing these beliefs are outlined by the authors as follows :—

1. The drug acts chiefly, or in large part, by stimulating immunity.
2. The drug indirectly kills the invading organism by an opsonin-like action which makes the parasite more easily phagocytosed.
3. The drug is fixed or absorbed by the reticulo-endothelial system in such a way that its redistribution facilitates a longer drug-parasite contact.
4. The drug is converted by the reticulo-endothelial system (or other tissue) into a more chemotherapeutically active metabolic transformation product.
5. The drug inhibits reproduction of the invading organism which then becomes more vulnerable to the phagocytes or other defence mechanisms.

The present investigation was designed to test these theories, with special reference to the spleen, during the quinine treatment of *P. gallinaceum* infections of chickens and provided little or no support for them. The chickens used were kept on an alternate light and dark schedule for twelve hours and were infected by parasitized blood or sporozoites intravenously. Blood smears were examined once per day or more frequently during the course of the infection and the parasite counts were recorded per 10,000 red blood cells. Quinine dihydrochloride was given orally in capsules or intravenously according to body weight. Experimental results showed that splenectomy increased the mortality of treated and untreated chickens in comparable degree and indicated that the activity of quinine was not affected by this organ. Its removal lessened acquired but not innate immunity. The increase in acquired immunity produced by the spleen during infection is responsible for the crisis and subsequent low rate of parasitaemia. Observations on phagocytosis during the period of innate immunity in the case of blood-induced infections, treated with quinine indicated that the drug did not increase the phagocytic activity of macrophages of liver and spleen, which was marked, or those of bone-marrow which was much less intense. It appeared also that quinine did not make the parasites more easily phagocytosed, *i.e.*, possessed no opsonin-like activity. The results obtained during acquired immunity of blood- or sporozoite-induced infections led to conclusions similar to those above. Apart from the decreased phagocytosis associated with inhibition of parasitic growth and reproduction, histo-pathological studies failed to reveal any alteration in defence processes resulting from quinine treatment of the chicken host. The authors concluded that the spleen and the drug acted independently in suppressing infection.

II. In this paper the mechanism whereby splenectomy appears to decrease the suppressive value of quinine in *P. gallinaceum* infection of chickens was investigated further by studying the course of infections in groups of splenectomized and non-splenectomized birds which did or did not receive quinine. In spite of the fact that quinine blood levels were raised and maintained for a longer time in the infected splenectomized chickens, the value of such increases was offset by the decrease in acquired immunity to which that organ gives rise. The rise in blood levels may have resulted from the infection *per se*, as earlier authors had found that for a given dose of quinine the concentration of the drug in tissues was frequently higher in infected than in non-infected chickens. On the other hand the rise may have followed splenectomy *per se* or, as also previously recognized, from the increased parasitaemia in absence of that organ with resultant more marked anaemia. There was a negative correlation between the quinine blood level and the number of red cells. The effect of quinine therapy on acquired immunity due to the spleen, as a result of specific and non-specific stimulation of that organ,

was also studied. For specific stimulation, chickens previously infected with *P. lophurae* (which gives rise to a slight cross-immunity with *P. gallinaceum*), and for non-specific stimulation intramuscular injection of sheep serum (which causes a lymphoid hyperplasia), were used. Acquired immunity was increased by the specific treatment and was additive to the effect of quinine on the parasites. Under these conditions a standard dose of the drug exerted a more marked suppression of the infection. The non-specific stimulation did not influence the suppressive action of the drug or affect the quinine blood level, and agrees with the previous finding that innate immunity is uninfluenced by splenectomy. The authors therefore conclude that while the reticulo-endothelial system may absorb quinine it probably does not release it slowly into the blood with resultant longer contact between parasite and drug.

III. In the first two papers of this series evidence has been adduced that acquired immunity, due to the spleen, in *P. gallinaceum* infections of chickens, is additive to and independent of, the antimalarial action of quinine. The effect of innate and acquired immunity and the antimalarial action of quinine have been further studied in various combinations. Results showed that these factors operate independently. More detailed consideration is given to the possibility that the reticulo-endothelial system may influence the action of quinine by converting it to a more active metabolite or ingest more rapidly the parasites affected by the drug. All the evidence suggested that quinine acted directly on the parasites. The only metabolite isolated so far (a 2-hydroxy-quinoline derivative) has been shown to be less active than the parent substance. At sufficiently high levels quinine was able to suppress the infection with *P. gallinaceum* effectively in absence of acquired immunity and may even prevent development of the latter as indicated by the marked rise in parasitaemia which resulted when drug treatment was discontinued. It seemed clear that early treatment by quinine in suitable doses allowed acquired immunity to be developed. The earlier finding that splenectomy increased the therapeutic effectiveness of quinine, by raising and prolonging its level in the blood, was confirmed. There was however an overall loss in suppression of the infection through reduction in the factor of acquired immunity when the spleen was removed. As noted by earlier authors, the chief action of quinine early in the infection, when only innate immunity was operative, appeared to be that of inhibiting growth and reproduction of parasites, without however exerting an opsonizing effect, so that they were not more readily phagocytosed. Quinine may also cause death of the parasite, but such an effect is more commonly due to immune reactions. Evidence is added to that previously given to show that parasites damaged by quinine are in fact removed from the circulation more slowly than those in untreated infections. The authors are careful to point out that their results are applicable only to the particular drug, host and parasite employed.

[Many references to their own work and that of other authors are given and have been regularly abstracted in this *Bulletin*. This important and very detailed investigation does not lend itself readily to abstraction and those interested would find it profitable to consult the original.] *J. D. Fulton*

GREENBERG, J. **Inhibition of the Antimalarial Activity of Chlorguanide by Pteroyl-glutamic Acid.** *Proc. Soc. Exper. Biol. & Med.* 1949, June, **v.** 71, No. 2, 306–8.

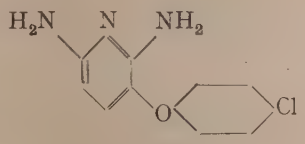
The author draws attention to some relationships which he has shown to exist between chlorguanide [paludrine, proguanil] and sulphadiazine [this *Bulletin*, 1949, v. 46, 119]. Thus, in *P. gallinaceum* infections of chickens, they exert a synergistic effect. He also found, in contrast to BISHOP and

McConnachie [*ibid.*, 119], that a strain of the same plasmodium made resistant to paludrine was hypersensitive to sulphadiazine [*ibid.*, 912]. The antimalarial action of sulphadiazine is antagonized by *p*-aminobenzoic acid whereas that of paludrine is not. Pteroylglutamic acid (PGA) can inhibit the action of some sulphonamides and this investigation was carried out to see if it acted similarly with paludrine. Chickens one week old were treated orally with solutions of paludrine a few hours before intravenous inoculation with 16×10^6 erythrocytes parasitized by *P. gallinaceum* from a donor bird. Treatment was continued twice daily for four days while PGA was given at the same time in gelatin capsules. Parasite counts were made on the day after treatment ended and a reduction of 75 per cent. in parasitaemia over controls indicated the minimum effective dose which, for paludrine, was approximately 0·002 mgm. per gm. of body weight with the above dosage regimen. PGA alone exerted no appreciable effect on the course of the infection but a dosage of 0·02 mgm. per gm. significantly inhibited the action of paludrine. The degree of inhibition was not increased by ten times the former dose which corresponds to five molecules of PGA per molecule of paludrine. With increased dosage of paludrine the inhibition was less marked. The minimum effective dose of sulphadiazine was completely inhibited by 0·2 mgm. per gm. of PGA, whereas the antimalarial actions of quinine, chloroquine or pamaquin were unaffected. The author points out that if paludrine is competing with PGA directly results would be of value as a guide to synthesis of chemotherapeutic agents, but it is possible that the antagonism is indirect with a metabolite of pteroylglutamic acid.

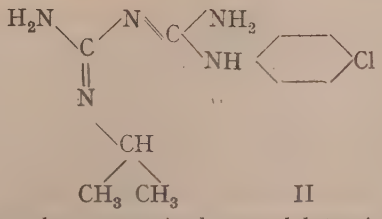
J. D. Fulton

Falco, E. A., Hitchings, G. H., Russell, P. B. & VanderWerff, H. **Antimalarials as Antagonists of Purines and Pteroylglutamic Acid.** [Correspondence.] *Nature.* 1949, July 16, 107–8, 4 figs.

In the preceding paper by Greenberg it was shown that the activity of paludrine [proguanil] against *P. gallinaceum* infections of chickens was significantly inhibited by pteroylglutamic acid (PGA) but it was not established whether there was a direct antagonism between these two substances. The present authors have found that most 2-4-diaminopyrimidines reversibly inhibited pteroylglutamic acid in the absence of purines from cultures of *Lactobacillus casei*. One substance, 2-4-diamino-5-*p*-chlorophenoxy-pyrimidine (I), was particularly active in this respect and also showed an activity against *P. gallinaceum* similar to that of quinine. Its formal relationship to paludrine (II) is shown below.



I



II

Experiment indicated that paludrine also antagonized pteroylglutamic acid (PGA) in so far as it inhibited the growth of *L. casei* but this action was reversible by the acid itself and by purines. A similar inhibition produced by quinine was only partially reversed by PGA and readily by adenine. Further investigation indicated that there was no definite correlation between pteroylglutamic acid antagonism and antimalarial activity. The authors' data suggest however that the latter substance and purines may be indirectly involved in this activity.

J. D. Fulton

Mudrow-Reichenow, Lilly & Reichenow, E. Die Entwicklung von *Plasmodium cathemerium* im Endothel und im Blut des Kanarienvogels. [**The Development of *Plasmodium cathemerium* in the Endothelium and Blood of the Canary.**] Reprinted from *Zool. Jahrbücher.* (Anatomie). 1949, Feb. 26, v. 70, No. 1, 129–68, 3 text figs. & 17 figs. on folding pl. [28 refs.]

In this paper—which was completed in 1945—the authors give a detailed account of the entire exoerythrocytic (EE) development of *Plasmodium cathemerium* in the canary. This is compared with *P. praecox* [=*P. relictum*], the life-cycle of which was previously (1943–1944) described by them [this *Bulletin*, 1944, v. 41, 190].

The infections in the forty canaries used in their experiments were in most cases produced by inoculating the birds intramuscularly into the breast with 0·2 cc. of a saline suspension of teased-up and filtered heads and thoraces of infected *Culex* mosquitoes, each bird receiving about 1,600 sporozoites. The study of the life-cycle of *P. cathemerium* was based on stained organ and tissue smears of the birds sacrificed at various intervals after the infection.

The early stages of the development of this parasite occur at the site of inoculation of the sporozoites, whence they invade all the organs, but show a predilection for the spleen, liver, and especially the brain, in which the EE forms are found in the endothelial cells of the capillaries.

After a latent period of several hours the sporozoites at the site of inoculation are taken up by reticulo-endothelial cells (macrophages, monocytes). In these they become rounded and proceed to multiply by schizogony, giving rise to 32 nuclei 30 hours after inoculation, of which about 15 hours are occupied by the first nuclear division. The merozoites of the first generation again find their way into phagocytes which carry them to the inner organs, where they continue to develop in the endothelial cells. The schizonts of the first generation give rise to macromerozoites, which are larger than the merozoites of the erythrocytic cycle. In subsequent generations a minority of the schizonts produce small merozoites (micromerozoites), morphologically indistinguishable from those of the erythrocytic cycle. The micromerozoites of the second generation begin to enter the blood stream 63 hours after the inoculation of sporozoites. They invade the red blood corpuscles, giving rise to both the asexual and sexual (gametocytes) forms of the erythrocytic cycle, while the endothelial schizonts continue to produce macromerozoites by which the EE cycle is maintained in the host.

The maturation of each generation from the 2nd onwards occupies about 30 hours in the case of macroschizogony and 33 hours in the case of microschizogony, the number of merozoites resulting from the former being from 33 to 64, and from the latter 65 to 128. As the infection proceeds the ratio of microschizonts to macroschizonts in successive generations rises progressively. After some time the number of parasites both in the blood and in the tissues begins to diminish and the infection may finally assume a chronic character, with scanty parasites, but liable to relapse. The course of *cathemerium* infection in canaries varies, being in some cases rapid, with a fatal termination after 9–12 days, while in others the infection passes into a chronic phase after 2–3 weeks.

The authors have demonstrated—by blood subinoculation—that the merozoites derived from erythrocytic schizonts are capable of initiating the EE cycle in the recipient host, from which it would seem that the micromerozoites may give rise to macroschizonts in the tissues of the bird. The two cycles—erythrocytic and exoerythrocytic—are therefore interchangeable.

The brief summary given above does not do full justice to the very thorough and detailed account, accompanied by tables and graphs, given in this paper. It is illustrated by a number of photomicrographs and contains references to the literature appearing after 1944.

In an appendix the authors discuss the recent findings regarding the EE stages of development in mammalian malaria parasites. *C. A. Hoare*

TRYPANOSOMIASIS

Ferreira, F. S. da C., Pinto, A. R. & de Almeida, C. L. Sobre o grau de infestacão por tripanosomas das glossinas da Guiné Portuguesa. [**Trypanosome Infection Rates of Glossinae in Portuguese Guinea**] *An. Inst. Med. Trop.* Lisbon. 1948, Dec., v. 5, 251–61, 1 folding map. English summary.

The authors dissected 2,055 tsetse flies and found 140 (6·81 per cent.) of them infected with trypanosomes as follows: *Glossina palpalis*, 65 infected out of 1,607 dissected; *G. submorsitans*, 42 out of 263; and *G. longipalpis*, 33 out of 185. Polymorphic trypanosomes were seen in 61 flies (2·96 per cent. of the dissections) and monomorphic trypanosomes in 63 flies (3·06 per cent.); *Trypanosoma grayi* occurred only in *G. palpalis*, 7 flies (0·34 per cent.) and unidentified trypanosomes were seen in 9 flies (0·43 per cent.).

[These percentages are based on the total number (2,055) of flies dissected and are given in the summary but not in the text. Percentages given in the three tables are misleading because they are calculated on the total number of *infections* for all three species of *Glossina*, not on the number of *dissections* for each species separately; the conclusions regarding the infectivity rates of these three tsetse flies are based on these erroneous percentages.]

H. S. Leeson

Town, B. W., Wills, E. D. & Wormall, A. **Action of Suramin and "Antrycide" on Enzymes.** [Correspondence.] *Nature.* 1949, Aug. 6, 233.

In a previous note the authors have shown [this *Bulletin*, 1949, v. 46, 914] that small concentrations of suramin exercise a strong inhibitory effect on hexokinase, urease, yeast carboxylase, succinic dehydrogenase and trypsin. Further investigation has confirmed that the inhibition of enzymes by suramin is relatively specific; some enzymes are inhibited only at particular hydrogen ion concentrations, and many are unaffected through the whole range of *p*H over which they act. Specific enzyme inhibition, deranging the trypanosome's carbohydrate or protein metabolism or both may account for the chemotherapeutic activity of suramin.

Although antrycide is very different from suramin chemically, the authors thought it possible that the two compounds might act in a similar way on some metabolic enzymes. They have found, however, that antrycide in relatively high concentrations has no inhibitory effect on urease, succinic dehydrogenase, the yeast enzymes concerned in the fermentation of glucose, or on trypsin. Therefore, while suramin may perhaps act on trypanosomes by inhibiting carbohydrate metabolizing or proteolytic enzymes of these organisms, the mechanism of antrycide activity is probably different from that of suramin. *E. M. Lourie*

BUXTON, P. A. **Presidential Address on Control of Tsetse Flies by Human Settlement.** *J. Roy. San. Inst.* 1949, Sept., v. 69, No. 5, 615–16.

In this short Presidential address the author introduced the subject in such a way that people not familiar with sleeping sickness work would be able to follow his reasoning. One important point is that the veterinary aspect of trypanosomiasis and therefore indirectly the agricultural and medical aspects) is more important than the present low rate of spread of the disease in man. Loss of cattle from the trypanosomiasis means poor agriculture and therefore poor nutrition. A second point is that the settlements created in Tanganyika, where the people have been concentrated, and from which *Glossina morsitans* has largely retreated, held 190,000 people in 1944 ; some of these settlements have been in existence for 20 years. The Anchau settlement in Nigeria is perhaps the most interesting public health experiment in Africa ; it needed the combined efforts of medical men and entomologists, together with those of persons who knew and took into account the African social conventions and agricultural customs [and modified them]. *Charles Wilcocks*

HEWITT, R. I., GUMBLE, A., KUSHNER, S., SAFIR, S. R., BRANCONE, L. M. & SUBBAROW, Y. **Experimental Chemotherapy of Trypanosomiasis. I. Effect of *p*-Phenylene Diguanidine and Related Compounds against Experimental Infections with *Trypanosoma equiperdum*.** *J. Pharm. & Exper. Therap.* 1949, July, v. 96, No. 3, 305–14.

Among compounds examined since 1944 for chemotherapeutic effect against trypanosomiasis, *p*-phenylene diguanidine seemed worthy of detailed study. It was found to be curative for *T. equiperdum* infections in mice and rabbits but was much less effective than arsenicals, suramin or stilbamidine when administered parenterally. Given orally, in divided doses over a period of 3½ days, it behaved somewhat better. It was five times more effective than suramin and one-sixth as effective as stilbamidine. The ratio of curative dosage on oral treatment to curative dosage on intraperitoneal treatment was 500 for suramin, 120 for stilbamidine and 5 for *p*-phenylene diguanidine.

Of closely related aromatic guanidines none proved more promising than *p*-phenylene diguanidine.

No compound in this group exercised any action against *Leishmania donovani* in hamsters, *Schistosoma mansoni* in mice, *Litmosoides carinii* in cotton rats, *Plasmodium lophurae* in ducks or *Trypanosoma cruzi* in mice. *E. M. Lourie*

NEGHME, A., ROMÁN, J. & SOTOMAYOR, R. Nuevos datos sobre la enfermedad de Chagas en Chile. [**New Data on Chagas's Disease in Chile.**] *Bol. Oficina Sanitaria Panamericana.* 1949, Aug., v. 28, No. 8, 808–17, 2 figs. [11 refs.]

The English summary appended to the paper is as follows :—

" The authors present the results of investigations on Chagas' Diseases [*sic*] in Chile up to June 30, 1948. During systematic epidemiological surveys made of representative sample zones affected by endemias, 14,408 persons were examined, resulting in a 12% of infestation by *T. cruzi*. From the Tarapaca to the O'Higgins provinces, 1,729 proved cases were found ; 10,666 complement fixation tests were made which showed positive in 14·25%. The average index for trypanotriatoma from the Tarapaca to the Colchagua provinces is 44·1% for 20,952 samples of *T. infestans*. By xenodiagnosis, a 10·9% of positivity was found in 4,006 domestic and wild animals examined. There were 411 confirmed acute cases found in the provinces of Santiago and Aconcagua and 124 in the province of Coquimbo, as a result of clinical investigations with special reference

to cardiopathy. Prevention of Chagas' Diseases was attempted by the application of DDT in all the rural zones. The application of 1,132 houses with DDT—5% in kerosene—showed that it was possible to control the breeding of the triatoma in 90% of the cases, with a low index of them up to 12 months later. Success was also obtained by the use of gammexane in smoke-generators. The authors mention the laws which are in force covering the prevention of the disease, as well as bills submitted to congress on rural dwellings and programs for future clinical investigations."

PELLEGRINO, J. Transmissão da doença de Chagas pela transfusão de sangue. Primeiras comprovações sorológicas em doadores e em candidatos a doadores de sangue. [**Transmission of Chagas's Disease through Blood-Transfusion.**] *Rev. Brasileira Med.* Rio de Janeiro. 1949, May, v. 6, No. 5, 297–301, 1 fig. [Bibliography.] English summary.

In Belo Horizonte, Brazil, Chagas's disease is fairly common and the vectors are abundant; nevertheless many doctors fail to recognize the facts and do not take sufficient care when blood-transfusion is called for. As syphilis, malaria, relapsing fever and other diseases may be thus transmitted the author has investigated the question of the possible infectiveness of blood donors. How rife the infection is is evidenced by the fact that among 8,142 unselected country-dwellers 1,383 (17 per cent.) reacted positively to a complement deviation test. Xenodiagnosis is far from infallible in chronic cases and it is these who show few or no symptoms and who might be selected as donors for blood-transfusion."

The author has tested 179 blood-donors in the Belo Horizonte Tranfusions Service. He found two who were on the establishment and a third who was offering himself as a donor giving a positive complement fixation and two other volunteers were doubtful. All those positive had lived in *Triatoma*-infested houses; two of them showed no symptoms of infection. One who had given 300 cc. of blood on more than one occasion and showed no signs of infection nevertheless gave a positive Guerreiro-Machado reaction twice.

The author in consequence recommends that the blood of all prospective donors should be tested for complement deviation and any giving a positive or a doubtful reaction should be excluded and that, if blood is needed urgently, only those donors should be used who are definitely known to be uninfective.

H. Harold Scott

DE FREITAS, J. L. P. & DE ALMEIDA, J. O. Nova técnica de fixação do complemento para moléstia de Chagas. (Reação quantitativa com antigeno gelificado de culturas de *Trypanosoma cruzi*.) [**New Technique for Complement Fixation in Chagas's Disease.**] *Hospital.* Rio de Janeiro. 1949, June, v. 35, No. 6, 787–800. English summary.

For the diagnosis of chronic Chagas's disease serological tests are best, in fact almost necessary, owing to the difficulty of finding the trypanosomes. Davis's antigen is good but is not very stable so that constant control tests are necessary. The author's method of preparation has given a better antigen and he describes it as follows:—

A culture on blood-agar is made with trypanosomes obtained from human cases of the disease, and is suspended in physiological saline and centrifuged at 2,000 r.p.m. three times for 30 minutes each time, until the supernatant fluid is colourless. This is decanted and volume of the residue noted. This is then subjected to a temperature of −30°C. and dried *in vacuo* at room temperature over calcium chloride; usually this takes about 48 hours. The residue is ground

and benzene, five times the noted volume of the deposit, is added and left at room temperature with frequent shaking and exchanging for fresh benzene during another 48 hours. The supernatant benzene is then removed and the deposit dried at 37°C. for 12 hours. Distilled water to nine times the volume of the sediment is next added and left at room temperature with repeated shaking and then are added three volumes of chloroform which produces a jelly-like mass. This is shaken with glass beads and in a Boerner's shaker, distributed in quantities of 0·9 ml. in tubes and stored at −39°C. This retains its potency for three months or more and it is neither haemolytic nor anti-complementary. The author claims that the thromboplastic activity of the antigen is negligible.

The test has been made with 500 sera, divided into three groups. 1. Those known to be suffering from Chagas's disease by finding the trypanosomes in the blood in the case of living patients, or by xenodiagnosis, or by finding leishmania forms in the heart *post mortem*. There were 32 in this group. 2. Normal subjects or patients suffering from diseases other than Chagas's disease [presumably 350 in number as the other groups together account for 150]. 3. One hundred and eighteen suspicious cases suspicious either from presenting suggestive symptoms or living in a Triatomid-infested locality.

In the first group one gave a negative c.f. result although xenodiagnosis was positive. In three others the readings were negative after four hours in the ice-chest, but were positive after two hours at 3–6°C. followed by 30 minutes at 37°C. in a water-bath. The titres in all these ranged between 1·7 and 4·6. Of those in the second group none gave a positive with a titre above 1·4. Of the 118 in group 3, nine gave a positive in titre of 1·6–1·8 and 109 a titre between 1·9 and 4·8. From group 2 those with 1·4 or less are regarded as negative and from group 1 those above 1·9 may be considered as definitely positive, and the only difficulty arises among those with a titre of 1·6–1·8; in these the test should be repeated after a few days. *H. Harold Scott*

DE BARROS, L. C. A eletrocardiograma da forma crônica da moléstia de Chagas. [**Electrocardiographic Changes in Chronic Cases of Chagas's Disease.**] *Hospital*. Rio de Janeiro. 1949, May, v. 35, No. 5, 705–30, 16 figs. [18 refs.] English summary.

During the past five years, says the author, study of Chagas's disease has been much intensified and the electrocardiographic recordings have shown such variations that a full and detailed revision is now warranted in order that we may know whether these tracings are peculiar to different phases of the disease or whether they may take on different forms in the one phase.

The present article gives the results of such a detailed study of 47 patients, all of whom were shown to be genuine cases of the disease in that they all gave a 3-plus or 4-plus reaction to the Machado-Guerreiro test. The findings and observations are, and will be, of the greatest interest to expert cardiologists, but are much too detailed and intricate for the general practitioner, unless the Brazilian doctor is much more highly trained in this speciality than are practitioners in other countries. More than 170 cardiographic tracings are reproduced, most of them unfortunately too small for easy reading, and these are discussed under the two main heads of auricular and ventricular complexes. Each of these is again subdivided and the numbers of each type among the 47 patients are stated in percentages of the total. For example, in the auricular complex group, 4 or 8·5 per cent. showed P waves of low voltage, and 31·9 per cent. (15) of high voltage or auricular hypertrophy, and 18 (38·3) had a lengthened wave, or more than 0·11 second. Diphasic and other forms of P wave are similarly considered and the ventricular complex, AV block, extrasystoles and other changes. All these vary within wide limits in chronic

Chagas's disease between the normal and advanced myocardial disturbance, the most common being a "widened and irregular P, increased PR, QRS of the R.B.B.B. type and marked left axis deviation and fairly frequent polytopic ventricular extrasystoles." Those interested in more detail should consult the original. *H. Harold Scott*

GOBLE, F. C. **Chemotherapeutic Activity of certain 8-Aminoquinolines, particularly Pentaquine, in Experimental Chagas' Disease.** *J. Parasitology.* 1949, Aug., v. 35, No. 4, 375–8.

Appreciable success in the treatment of *T. cruzi* infections has so far been achieved only by compounds of the type of the quinaldine derivative Bayer 7602 (Ac) [MAZZA, COSSIO and ZUCCARDI, this *Bulletin*, 1937, v. 34, 936], the trivalent arsenical Bayer 9736 (As) [MAZZA, BASSO and BASSO, *ibid.*, 1943, v. 40, 22], and certain phenanthridinium salts [BROWNING, CALVER, LECKIE and WALLS, *ibid.*, 1946, v. 43, 633].

It has now been found that certain antimalarial 8-aminoquinolines (the group to which pamaquin belongs) are active against *T. cruzi* infections in mice. For "screening tests" mice were infected by intraperitoneal inoculation of culture material, treatment being started four days later and consisting of intraperitoneal injections administered daily for five or six days. For "evaluation tests" the duration of treatment varied in different experiments, and included both intraperitoneal and oral regimens. Results were measured by the percentage of survivors and by the mean survival times. Untreated controls usually died. The compound which gave the best results among quite a small group of 8-aminoquinolines studied was pentaquine, a high percentage of cures being obtained whether treatment was by the intraperitoneal or the oral route.

The author's opinion is that the potential usefulness of these pamaquin analogues in clinical practice is questionable in view of the known toxicity of the group as a whole.

No action was discovered against *T. congolense* or *T. brucei* infections. *E. M. Lourie*

PELLOUX, A. & DECOURT, P. Essai d'application pratique du S.N.P. dans la lutte contre la maladie de Chagas. [**Trials in the Practical Application of SNP (Thiophosphate o'diethyl o'paranitrophenyl) for the Prevention of Chagas's Disease.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 3/4, 114–16.

The houses, treated in this experiment with SNP either as an emulsion or as a dust, were of wooden construction and gave ideal refuge to domestic parasites.

Five rooms of one house were sprayed with a 1 per cent. emulsion at the rate of 200 cc. per sq. metre. Three rooms of another house were thoroughly dusted with 0·25 per cent. "Rhodiatox" powder giving a deposit of 10 gm. of powder per sq. metre. One room and a poultry house were treated with 0·5 per cent. powder.

SNP used either as an emulsion or as a powder killed *Triatoma, Argas persicus, Ornithodorus tolidor* and *Lyponyssus bursa.*

The authors suggest that the dust is more effective where the house construction is poor and there are irregular planks and crevices, since the powder penetrates the interstices and remains effective for a long period. An emulsion, on the other hand, is rapidly absorbed by the wood. *C. M. Harrison*

Borzone, R. A., Lapieza Cabral, P. & Aizemberg, M. Primera observación Argentina de Tripanosoma rangeli (Tejera). (Nota previa). [**First Record of *Trypanosoma rangeli* (Tejera) in the Argentine.**] *Semana Méd.* 1949, Aug. 25, v. 56, No. 34, 348–9, 1 fig.

In November, 1924, the senior author was examining the blood of persons in Yacuiba, on the frontier between the Argentine and Bolivia. He found a trypanosome " easily distinguishable from *T. cruzi* by measurements and cytological differences " and demonstrated it to Professor Huhlens [? Mühlens] of Hamburg who happened to be visiting Tucumán. Years later, in 1947, he found 12 cases of Chagas's disease in Santa Fé and some 40 per cent. of *Triatoma infestans* collected in the rural hamlets were found infected by *T. cruzi*. In 1949, when examining the blood of a child from the northern part of the town he found two forms of trypanosome, *T. cruzi* and *T. rangeli*, confirmed by xenodiagnosis, by cultivation and by staining. He was able to transmit the latter to young leghorn pullets by a culture ; five days after subcutaneous inoculation the parasites were abundant in the liver. *H. Harold Scott*

LEISHMANIASIS

Sergent, Ed. & Sergent, Et. Agents de propagation et réservoirs de virus des leishmanioses en Afrique du Nord. [**Vectors and Reservoirs of Leishmaniasis in North Africa.**] *Arch. Inst. Pasteur d'Algérie.* 1949, June, v. 27, No. 2, 101–5.

The paper was a contribution to the jubilee volume of Professor Caronia. It gives a valuable, rather brief historical account of the growth of our knowledge of oriental sore, and of visceral leishmaniasis in North Africa.

P. A. Buxton

d'Eshougues, J. R. Kala-azar sans parasites décelables. Guérison rapide par le traitement d'épreuve. [**Kala Azar without Demonstrable Parasites. A Rapid Cure by Approved Treatment.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1949, Nos. 9/10, 416–21, 2 figs. [17 refs.]

A boy of 14 years, after returning from a hunting party (presumably in Algeria), had a febrile disease which had defied diagnosis for five weeks when first seen by the author. Numerous serological and bacteriological investigations had all been negative and chemotherapy had failed to control it. He had a markedly enlarged spleen, a slightly enlarged liver, and a swinging temperature which later developed a double daily rise. There was a moderate degree of anaemia (4·1 millions red cells per cmm.) and a leucopenia (2,400 per cmm.). Kala azar was suspected on account of the above findings and his close association with hunting dogs, but splenic and sternal puncture were both negative. [It is not stated whether an attempt at culture was made.] The glands in the left iliac fossa were found to be enlarged—firm, mobile and painless. Malignant reticulo-endotheliosis was now suspected. Additional laboratory examinations, including blood, stool and urine cultures, serological tests for *Br. melitensis* and the enteric group, skin tests for tuberculosis, and gland and splenic puncture were negative. A biopsy of a gland showed the gland architecture still recognizable though blurred by diffuse parenchymal hyperplasia, but no changes characteristic of any particular disease.

The " formol-leucogel reaction " was " strongly positive "—immediate gelification with complete opacity in 30 minutes. This observation led to

treatment for kala azar being undertaken ; 3 grammes, 4·5 grammes and subsequently 6 grammes of glucantime were given on successive days up to a total of 64·5 grammes in 12 days. There was an immediate improvement, the temperature came down on the third day but rose daily above normal until two days after the completion of treatment, the general condition improved remarkably, the spleen was reduced, the weight increased rapidly (4 kilogrammes in two weeks), and the blood picture improved (leucocytes 2,800 to 5,600 per cmm. in two weeks). Within three weeks of the completion of treatment the boy had returned to school and at ten weeks he was seen and found to be flourishing.

Meanwhile it was ascertained that the patient's favourite dog had leishmaniasis.

The author discusses the diagnosis with many references to the French literature on this subject. *L. E. Napier*

Clark, M. **A Case of Kala-Azar.** *East African Med. J.* 1949, Aug., v. 26, No. 8, 219–21.

Sati, M. H. **Post-Stilbamidine Neuropathy, with reference to the Retention of the Drug in the Body.** *Ann. Trop. Med. & Parasit.* 1949, Apr., v. 43, No. 1, 4–12. [12 refs.]

The author has seen many instances of mental symptoms after the use of old or irradiated solutions of stilbamidine, and he also had a patient who developed epileptiform seizures after 300 mgm. of freshly prepared stilbamidine isethionate given daily for 15 days, concurrently with 25 grammes of potassium antimonyl tartrate.

In the present series of 45 patients suffering from kala azar treated and cured by stilbamidine, there was evidence of a neuropathy in 41. The number of injections given varied from 15 to 45 in 42 cases ; one patient received 7 injections and two 60 injections. The relative dose of the injections varied from 1·5 to 4·6 mgm. per kgm. of body weight. The isethionate was used in all but four cases ; in these the dihydrochloride was used. The onset of symptoms occurred between one month and thirteen months after cessation of treatment. The duration of symptoms varied up to 90 months, the full period of observation.

The areas involved were those of the fifth cranial nerve, in each case, with in addition the seventh and ninth cranial in one case, the second, third and fourth cervical in about half the cases, and in two cases the third and fourth dorsal.

The common symptoms were the usual ones, itching (39 cases), numbness (22 cases), formication (9 cases), hyperaesthesia (9 cases), blinking (15 cases), and watering of the eyes (10 cases), loss of fine touch (31 cases) and of temperature sense (28 cases). There is a list of 18 other signs or symptoms less commonly encountered ; these included twitching of the face or calf muscles, palpitations, loss of hair of eyebrows, loss of sense of taste and numbness of inside of mouth, defective vision, drooping of eyelids and loss of tactile localization.

No form of treatment was effective.

In 37 cases the urine was tested photochemically with ultra-violet light by the method of Henry and Grindley [this *Bulletin*, 1945, v. 42, 783]. In all the cases showing the neuropathy there was evidence of stilbamidine, from a trace to 0·40 mgm. per 100 ml. ; in those showing no neuropathy there was none or only a trace. All the latter had received no treatment since 1944 or earlier. One patient who had been treated in 1942 showed 0·008 mgm. per 100 ml. and still had the neuropathy. *L. E. Napier*

Sen Gupta, P. C. **Treatment of Kala-Azar with Hydroxystilbamidine.** *Lancet.* 1949, July 16, 97–9, 2 figs. [10 refs.]

Six cases of kala azar were treated by hydroxystilbamidine (4 : 4′-diamidino–2-hydroxystilbene di-β-hydroxyethanesulphonate). This drug, synthesized by Dr. A. J. Ewins several years ago, had been found to compare favourably with stilbamidine in its *in vitro* and *in vivo* (in animals) action on *Leishmania* [this *Bulletin*, 1945, v. 42, 19 ; 1946, v. 43, 1126].

The patients were all Indians, aged 10 to 45, and the diagnosis in each case was confirmed by the finding of *Leishmania*. Five had received no previous treatment. The drug was given only intramuscularly in four cases, only intravenously in one, and by both routes in one ; for the former route a 10 per cent. solution was used and for the latter the drug was dissolved in 25 ml. of 25 per cent. glucose and given very slowly.

The intention was to give two courses of 10 injections each, on consecutive days with an interval of 7 to 10 days between courses, amounting to a total of 3 gm. per 100 lb. body-weight of patient, but the course was modified in half the cases on account of severe local reactions. The average total was 2·72 gm. per 100 lb. body-weight. The maximum individual dose given was 3·3 mgm. per kgm. Smaller doses were given at first to test tolerance.

There were no untoward symptoms other than local inflammation at the site of the intramuscular injections. All six patients were apparently cured.

The usual clinical criteria of cure were observed during or at the conclusion of the course of treatment, namely " cessation of fever, improvement in general health and gain in weight, shrinkage of the spleen, pronounced improvement in the leucocyte count, and a rise in the haemoglobin level ", in every case.

The six patients were followed up for 5, 5, 5, 4½, 3½ and 3 months, respectively, after the completion of treatment and were found to be free from symptoms of kala azar. *L. E. Napier*

Corradetti, A. Studi sulla epidemiologia della leishmaniosi cutanea nella regione del medio Adriatico. II. Osservazioni sulla biologia del *Phlebotomus perfiliewi*. [**Studies on the Epidemiology of Cutaneous Leishmaniasis in the Adriatic Coast of Italy. II. Observations on the Biology of** *P. perfiliewi*.] *Riv. di Parassit.* Rome. 1949, June, v. 10, No. 2, 111–16. English summary (2 lines).

In a part of the Abruzzi all houses, rural and urban, have been treated with DDT at 2 gm. per square metre of wall and ceiling. *Phlebotomus perfiliewi* generally became very rare. They seldom bit man indoors, though they occasionally did so in the open.

In areas not treated with DDT these insects attacked man in the open air in such numbers as have perhaps not been recorded elsewhere in the world. They could always be found abundantly in stables and houses. *P. A. Buxton*

Ortiz, I. & Pardo, L. E. Presentación de un caso de Leishmania tegumentaria múltiple con lesiones lepromatoides. [**Multiple Cutaneous Leishmanial Lesions resembling Lepromata.**] *Bol. Laboratorio Clinica " Luis Razetti ".* Caracas. 1949, June, v. 15, Nos. 29/30, 320–24, 2 figs.

The condition present is well shown by photographs. The patient showed numerous small nodules on ears, nose, arms, shoulders, gluteal region and thighs ; there was no open lesion. By scarification, or by obtaining lymph after squeezing with forceps, as when examining for *Myco. leprae*, the author found Leishman-Donovan bodies in large numbers. In short, the condition was one of generalized cutaneous leishmaniasis. *H. Harold Scott*

FEVERS OF THE TYPHUS GROUP

FONSECA, F. & WOHLWILL, Fr. **Tifus exantemático.**

This book is reviewed on p. 1195.

PETRIE, P. W. R. **Epidemic Typhus in Southwestern Arabia.** *Amer. J. Trop. Med.* 1949, July, v. 29, No. 4, 501–26, 9 figs.

The author gives a somewhat discursive description of his experiences in an effort to control louse-borne typhus which he found occurring in epidemic form during the years 1939–43, in the hilly region of the Yemen in South-West Arabia, near the Aden Protectorate.

From references contained in the paper it appears that the places affected were at altitudes of 4,000 feet and upwards. In the capital, San'a the average mean shade temperature during the three months, October to December, is said to be 57°F. as compared with 75°F. during the same period in Aden.

There must have been ample opportunities for the introduction of infection into the low-lying torrid areas of South Arabia, but neither typhus nor louse-borne relapsing fever appears to have become established in any of the coastal zones of the country. *John W. D. Megaw*

KRYŃSKI, S. **Investigations of Strains of *Proteus X* Type cultivated from the Organs of White Mice and House-Mice infected intranasally with *Rickettsia prowazeki*, the Causative Organism of Typhus Fever.** *Bull. Inst. Marine & Trop. Med., Med. Acad., Gdańsk, Poland.* 1948, v. 1, No. 1, 29–32.

The author has carried out a series of serological and biological investigations, "still incomplete", into strains, believed to be of *Proteus X* which were isolated from the organs of mice inoculated intranasally with *Rickettsia prowazeki*.

Such strains were never found in healthy mice and the conclusion reached is that the occurrence of the strains is "explainable by a dissociation of *R. prowazeki* which in mouse organisms passes into a non-virulent form of *Proteus X*." *John W. D. Megaw*

PHILIP, C. B., TRAUB, R. & SMADEL, J. E. **Chloramphenicol (Chloromycetin) in the Chemoprophylaxis of Scrub Typhus (Tsutsugamushi Disease). I. Epidemiological Observations on Hyperendemic Areas of Scrub Typhus in Malaya.** *Amer. J. Hyg.* 1949, July, v. 50, No. 1, 63–74. [20 refs.]

This paper consists of a detailed description of the epidemiological conditions prevailing in three areas near Kuala Lumpur in which scrub typhus occurred in hyperendemic form.

Area I was part of a rubber plantation in which the mature trees had been cut down by the Japanese in 1943 and the ground had become overgrown with weeds and shrubs. In the work of clearance 37 out of a gang of 80 Tamil workers were attacked by scrub typhus between December, 1947, and July, 1948.

Area II had been primary jungle which was cleared by the Japanese for growing food crops, but had later become overgrown with grasses. Among 17 persons engaged in cutting grass in the area ten were attacked by scrub typhus.

Area III consisted of abandoned vegetable gardens which had become overgrown with *lalang* grass. Nearly 100 Japanese internees were attacked by scrub typhus while engaged in cutting grass in late 1946.

In none of the above areas had scrub typhus been known to occur before the Japanese invasion.

The survey was on standard lines. The most striking finding was the recovery of 18 strains of *Rickettsia tsutsugamushi* from pools of mites. Three of the strains were from pools of 22 to 100 *Trombicula deliensis*, and 15 were from pools containing *T. deliensis* and *T. akamushi*. Twelve of the strains were from pools of mites collected from wild rats (*Rattus r. argentiventer*), four were from mites obtained from white rats exposed in cages, and two were from mites found on the only two quails that were investigated.

The biting habits of the mites were studied on some of the 46 volunteers who exposed themselves in the infested areas during the first field trial. The mites remained attached for at least five to six hours after biting, but within about 18 hours most of them had dropped off.

During the first trial 29 of the 46 volunteers became infected through exposure in the areas for five to seven hours daily for nine days. During the second trial eight of the 29 other volunteers, exposed at a later date in the same areas for five to six days, became infected ; by this time the number of mites had become reduced by a spell of dry weather. *John W. D. Megaw*

Smadel, J. E., Traub, R., Ley, H. L., Jr., Philip, C. B., Woodward, T. E. & Lewthwaite, R. **Chloramphenicol (Chloromycetin) in the Chemoprophylaxis of Scrub Typhus (Tsutsugamushi Disease). II. Results with Volunteers exposed in Hyperendemic Areas of Scrub Typhus.** *Amer. J. Hyg.* 1949, July, v. 50, No. 1, 75–91, 3 figs. [18 refs.]

The prophylactic effect of chloromycetin was tested by giving doses of 1·0 gm. daily by the mouth to 22 of the volunteers referred to in the preceding paper. The drug was given during the days of exposure to risk and for 13 days afterwards ; the other 24 volunteers served as controls.

Between the 12th and 26th days after the first exposure 17 (71 per cent.) of the untreated controls were attacked by scrub typhus. Among the 22 treated there were 12 attacks (55 per cent.) but these occurred between the 31st and 36th days so that the disease had been suppressed till at least eight days after cessation of the treatment. In a second trial, carried out on 29 volunteers, oral doses of 4·0 gm. each were given on the 6th, 13th and 20th days after the first exposure to risk to 12 persons, the remaining 17 persons acted as controls.

Five of the 17 controls were attacked between the 10th and 15th days after first exposure ; among the 12 treated persons there were three attacks which occurred between the 26th and 28th days after first exposure. This intermittent treatment gave the same results as the daily treatment in delaying the onset.

The only significant difference between the attacks among the treated as compared with the controls was that no eschars occurred among the treated whereas there were six among the controls. Rickettsiae were isolated from the blood of 34 out of the 37 patients.

All the 37 patients were treated with chloromycetin, usually from the second to the fourth day after the onset ; the temperature fell to normal within 16 to 56 hours, the average being 32·1 hours. The initial dose was about 60 mgm. per kgm. body weight ; this was followed by doses of 0·25 gm. every 2–3 hours till defervescence. There was no evidence of drug fastness.

Among the 29 patients in the first trial, 18 had relapses during the first two weeks after apparent recovery, and in most of these cases the blood was infective to mice. The relapses occurred among the patients of the prophylactic as well as of the control group. In five cases there were two relapses and in three cases there were three. The relapses were treated by chloromycetin except in one case in which a third relapse was left untreated and it subsided within " a matter of hours."

There was suggestive, though not conclusive, evidence that relapses occurred more frequently among the patients whose treatment was started early.

Eight of the volunteers had been inoculated with the British (Karp) type of vaccine prepared in 1945, and two had received relatively fresh vaccine of the American type; there was no evidence that either vaccine had any protective value, and it is stated that the American vaccine has recently been shown to be useless in Japan.

The only suggestion of toxicity of chloromycetin was the occurrence of a moderate degree of insomnia in some cases after 4·0 gm. doses. One patient said that he had felt the same degree of euphoria after a 4·0 gm. dose as after a dose of 2·5 mgm. of benzedrine.

The authors discuss the similarity of the prophylactic effect of chloromycetin to that of mepacrine in *vivax* malaria. *John W. D. Megaw*

HILDICK-SMITH, G. **Tick-Bite Fever : Report of a Case treated with Aureomycin.** *South African Med. J.* 1949, Aug., 20, v. 23, No. 34, 702–3, 1 fig.

Tick-bite fever, caused by a rickettsial organism, is common in Southern Africa and may have serious complications.

The author reports, with clinical details, a case of tick bite fever in a European male of 36. The case was clinically characteristic and was confirmed serologically.

It was decided to administer aureomycin and this was given orally, firstly in dosage of 250 mgm. at intervals of one hour for three doses, so that a high tissue concentration of the drug could be obtained. The dose was then repeated five times at intervals of two hours, after which the temperature became normal. The interval was then increased to four, six and finally eight hours. Therapy was stopped after a total of 4 gm. had been given.

The patient became afebrile in 14 hours, free from symptoms in 24 hours and was normal in 72 hours.

The author points to the need for more studies of cases of tick bite fever, so that the optimum dose and intervals may be determined : he refers to the two cases treated by GEAR and HARINGTON [this *Bulletin*, 1949, v. 46, 1025]. *H. J. O'D. Burke-Gaffney*

ROSENKRANZ, G. **Queensland Fever in Israel.** *Harefuah.* Jerusalem. 1949, Aug. 15, v. 37, No. 4. [In Hebrew 37–41, 5 figs. (12 refs.) English summary 41.]

Q fever has already been detected in Israel [this *Bulletin*, 1949, v. 46, 1026]. The present authors saw increasing numbers of cases of epidemic primary atypical pneumonia, without atelectasis in most cases, and with no cold agglutination.

As Q fever was suspected, specific complement fixation tests were made and in 40 cases, titres of 1/32 to 1/2,054 were found. In some, the titre rose fourfold during the disease. There were 220 patients in all, of whom only 20 were in-patients.

The clinical, radiological and other features are described. All but two cases examined radiologically showed lung involvement, usually in the lower lobes.

The temperature remained raised for five to 30 days (one case in the latter instance) with an average of ten to 12 days. Bradycardia was usually present. The only complication noted was orchitis, which occurred in one patient on the tenth day. There were no deaths directly attributable to the disease.

H. J. O'D. Burke-Gaffney

KOMAROV, A. & GOLDSMIT, Leah. **Isolation of the Causative Agent of Q Fever *C. burneti* in Israel.** *Harefuah.* Jerusalem, 1949, Aug. 15, v. 37, No. 4. [In Hebrew 41–3. English summary 43.]

In connexion with the outbreak of Q fever in Israel referred to above, the authors succeeded in transferring the disease from the blood of a human case to guineapigs and isolating *R. burneti* from these animals by egg inoculation. This organism was passaged and recovered successfully in other guineapigs.

The incubation period in guineapigs after the first inoculation of human blood was eight days : the incubation period was shortened during five serial passages. In guineapigs a rise of temperature was the only manifestation of the disease.

So far, seven serial passages have been made in eggs. In the first, the embryos died in seven to ten days, but after the third passage they died in five to six days. From the third passage onwards, numerous rickettsiae were found in smears of the yolk sac.

Guineapigs infected with an emulsion of yolk sac developed a severe and fatal form of the disease, with many rickettsiae in smears from the internal organs. *H. J. O'D. Burke-Gaffney*

LENNETTE, E. H., CLARK, W. H. & DEAN, B. H. **Sheep and Goats in the Epidemiology of Q Fever in Northern California.** *Amer. J. Trop. Med.* 1949, July, v. 29, No. 4, 527–41, 2 figs. [22 refs.]

The first detection of the occurrence of Q fever in North California was made by a serological survey in March, 1948. It appeared that cattle did not play an important part in the epidemiology of the disease, but that goats and sheep were specially concerned.

In one district with 288,000 cattle and 628,000 sheep there were 150 proved cases of the disease between March and October, 1948. In 20 per cent. of the cases there was close contact exclusively with sheep and goats, and in 20 per cent. contact was only with cattle.

Cattle were encountered in only five of the 18 sites in which human cases occurred ; in the remaining sites sheep or goats were the only animals with which the patients had been in contact. Complement-fixation tests were carried out on 307 cattle of the affected areas, and only 2·6 per cent. gave positive reactions, whereas 37·9 per cent. of the sheep and 43·6 per cent. of the goats reacted.

Sera from slaughter houses gave positive reactions in 3·1 per cent. of cattle and in 3·5 per cent. of sheep ; these animals had not been specially associated with the occurrence of human attacks, and the findings were regarded as showing the low prevalence of infection in the region as a whole.

In the course of a limited survey the most striking results were obtained from five sheep belonging to a ranch in which 89·9 per cent. of the sheep were serologically positive : from one of the sheep with a complement-fixation titre of 1–512 *Coxiella* [*Rickettsia*] *burneti* was isolated from the milk. The organism was also isolated from a pooled sample of the milk of 10 goats belonging to a ranch in which 52·4 per cent. of the goats gave positive reactions.

The mode of transmission is not known ; swallowing infected milk and inhalation of infected dust are possibilities, transmission by ticks must be exceedingly rare.

Reference is made to the investigation carried out by CAMINOPETROS, who isolated the organisms from the milk of sheep and goats in Greece. [See this *Bulletin*, 1949, v. 46, 28–29.] *John W. D. Megaw*

YELLOW FEVER

KOMP, W. H. W. **A Note on Disease-bearing Mosquitoes breeding in Bromeliads.** *Mosquito News.* 1949, June, v. 9, No. 2, 72.

On several occasions Komp has collected larvae and pupae of *Haemagogus argyromeris* from water in the leaf-bases of a terrestrial Bromeliad, *Bromelia pinguin*, and once in an arboreal Bromeliad (*Gravisia* sp.), in the Panama Canal Zone. Other species of *Haemagogus* transmit yellow fever in jungle country, but they have hitherto been found breeding only in tree-holes, bamboo, etc. The new finding may have an importance in relation to the spread of yellow fever. Moreover, certain unidentified Sabethines were found breeding in terrestrial Bromeliads, and female adult *Haemagogus uriartei* were captured which could only have bred in them.

In a note on the same page F. C. BISHOPP reports the first outbreak of yellow fever in Panama since 1905. This occurred at the end of 1948, and there were five fatal cases near Pacora. The outbreak was terminated by prompt and widespread immunization. *Charles Wilcocks*

RABIES

ORTIZ MARIOTTE, C. Rabia humana en Mexico. [**Rabies in Man in Mexico.**] *Medicina.* Mexico. 1949, July 10, v. 29, No. 583, 255–61.

The date when rabies was first found in Mexico is not known, but an Anti-Rabies Institute was inaugurated in 1888. During the next 40 years the classical Pasteur method was used, but since then Semple's method or some modification of it. A table shows the numbers of deaths from rabies in each of 32 districts for each of the 10 years 1938 to 1947 ; the total was 410, the lowest, 23, in 1940, the highest, 66, in 1946, and the average 40. The sex was noted in 362 dying in the period 1938–1946, and 235 (64·9 per cent.) were males, 127 (35·1) were females, although a population census shows a preponderance of females. The ages of those dying are given ; 18 were under one year, 16 between 1 and 4 years, 62 between 5 and 9 years, 42 between 10 and 14 years, 19 between 15 and 19 years, and then in successive decades 97, 72 and 35 ; the age of one was not known. It is stated that " 23% of the deaths were not medically certified ", but that the histories in these were reliable. More detailed figures are given for the years 1945 to 1948. Of 66 deaths (said to be 30 per cent. of all deaths registered during this period as due to rabies) 37 were males, 29 were females ; bites were on the lower extremities in 25, on the head in 16, on the upper limb in 13 ; 17 of those dying were in the third decade, 11 were in the sixth decade. In 25, treatment by vaccine was started within 48 hours of infliction of the bite, in 3 it was later than this ; in 8 the vaccination was " irregular and interrupted ", and 30 received no specific treatment. During the period 1945 to 1947 altogether 4,008 persons received vaccine treatment and it is estimated that at least 83 per cent. of those bitten by animals certainly rabid escaped death from the disease. Nearly all those bitten received some treatment on the spot, either direct cauterization, application of corrosives, disinfectants, or suction of the wound. The interval between infliction of the bite and starting the vaccine treatment is given for the period 1945–47 in percentage figures : less than 1 day 1·92, 1 to 4 days 60·72, 5 to 7 days 23·6 ; that is, more than 86 per cent. received the treatment within a week. By far the most bites are inflicted by dogs, 3,867, as compared with cats which come next with 62 ; rats are third (stated as 27·3). The question of immunization of dogs is to be studied. *H. Harold Scott*

Balteanu, I., Constantinesco, N. & Toma, A. Recherches expérimentales sur la rage. [**Experimental Studies in Rabies.**] *Arch. Roumaines Path. Expér. et Microbiol.* 1948, v. 15, Nos. 1/2, 135–98. [57 refs.]

Koprowski, H. & Cox, H. R. **Studies on Chick Embryo adapted Rabies Virus. I. Culture Characteristics and Pathogenicity.** *J. Immunology.* 1948, Dec., v. 60, No. 4, 533–54, 1 fig. [26 refs.]

The authors have adapted four rabies strains (Flury, NYC, Zillwood and Dixon) to the chick embryo. They found seven-day-old embryonated eggs to be optimal and the best time for harvesting to be between the ninth and eleventh day after infection. Infectious titre seemed to depend somewhat on incubation temperature.

Another experimental series dealt with the virus distribution in eggs. Titres proved to be nearly identical in the central nervous system, the body and the chorio-allantoic membrane, slightly lower in the yolk sac and very much lower in the allantoic and amniotic fluids if harvested on the seventh day ; titres in these fluids, when harvested on the eleventh day, were, however, almost as high as elsewhere. From this distribution the conclusion is reached that the spread must be not neurogenic, as was proved for mammalians, but haematogenic. [Other work by the same authors now under publication on the infectivity of the blood from the chick embryo confirms this view.]

A further experimental series was designed to answer the question : what influence, if any, has the amount of original inoculation on the final titre ? Inocula of 0·03 cc. of dilutions 10^{-1} to 10^{-3} gave equally good results. The same volume of 10^{-4} dilution of the original embryo suspension (containing approximately 20 MLD) gave a poor yield. These findings are of much interest because of the fact that they do not confirm those of Henle in respect of the influenza virus which, with ultimate dilutions as inoculum, provides optimal results.

The pathology of rabies infection of the chick embryo has been extensively considered. The weight of infected embryos was found to be definitely under that of normal embryos and seemed to depend directly on the amount of the original inoculum.

Except when infected with the very early egg passages, chick embryos, infected on the seventh day, never hatched ; they died usually just before hatching time, *i.e.*, 14 days after infection—an outcome affected neither by the strain nor the inoculation route (intracerebral, yolk sac or amniotic). When the inoculation was carried out later, however, the ratio of hatching and of permanent survivors increased proportionately. The latest death with positive findings of virus took place 27 days after hatching. Later deaths, preceded by paralysis, were virus-negative.

The survivors were used for serological studies. Neutralizing antibodies were found regularly from the 17th day on after hatching and increased in titre sometimes up to the 195th day. The question as to whether or not such was due to latent infection with rabies thus arose. Blood samples contained the virus only up to a maximum of eight days after hatching.

The last of the experimental sections in the paper under review is devoted to the determination of changes in virulence for the laboratory animals during the process of adapting the virus to the chick embryo. Rabbits, after intracerebral inoculation with the Flury strain, showed an incubation period of 21 to 29 days, after which they frequently succumbed during the first attack of convulsions and were all dead in 24 hours. Peripheral inoculations gave no positive results in rabbits. Hamsters—highly susceptible to rabies virus—died regularly when inoculated with material up to the 58th passage of the

Flury strain ; later passage material tended to leave survivors that were but temporarily paralysed. Hamsters were invariably killed by the 30th passage level of the NYC strain. Guineapigs appeared to be more refractory to peripheral infection with egg-adapted strains, inasmuch as the incubation period was extended up to 10 to 14 days and death occurred in 15 to 19 days after infection. In guineapigs there was no case of spontaneous recovery. *G. Stuart*

Jonnesco, D. & Stamatesco, Silvia. L'action antibiotique de culture du bacille mésentérique sur le virus rabique fixe. [**The Antibiotic Action of *Bacillus mesentericus* on Rabies Fixed Virus.**] *Arch. Roumaines Path. Expér. et Microbiol.* 1948, v. 15, Nos. 1/2, 302–4.

The idea for the experimental work described in this article came from the observation that wounds from rabid animals which heal quickly give rise to the disease in a higher proportion of cases than do wounds which suppurate for a prolonged period. Culture media filtrates from staphylococci and streptococci, as well as from *P. pyocyaneus*, failed to reveal any power of neutralizing rabies virus, but with *B. mesentericus* the authors consider a virucidal action to have been established. [The conclusions are based on the use of only one animal per experiment. The culture fluid (stated to be a simple beef extract) would not appear to have been tested for possible virucidal properties. The titre of the inoculation virus was not determined.]

G. Stuart

Bussard, A., Bequignon, R. & Lamy, R. Contribution à l'étude de la rage. III. De la présence de hyaluronidase dans la bave de chien normal. [**Contribution to the Study of Rabies. III. On the Presence of Hyaluronidase in the Saliva of the Normal Dog.**] *Ann. Inst. Pasteur.* 1949, Aug., v. 77, No. 2, 183–5. [Summary appears also in *Bulletin of Hygiene.*]

Articles I and II of this series have been previously reviewed [this *Bulletin*, 1949, v. 46, 728]. In the present paper the authors describe a series of tests carried out with a view to proving that the saliva of normal dogs contains hyaluronidase. To this end they employed the measurement of viscosity reduction of a purified ammonium hyalurinate solution with a Couette type viscosimeter. Comparative tests with the Ostwald type provided similar results. Conventionally one V.R. unit was equal to 20 minutes.

The dogs were injected with 0·05 gm. pilocarpine ; of 14 tested as above only two dogs showed no hyaluronidase in their saliva ; the rest showed up to 154 units per cc. Boiling for more than five minutes completely destroyed the enzymatic action, while storage at +5°C. for two months led to a great reduction of activity.

From these results the authors conclude that the hyaluronidase content of the saliva enhances the virulence of the rabies virus and enables it to traverse the connective tissue and reach the nerve endings. *G. Stuart*

Vittorio Vanni, D. Nuevo método de coloración de los corpúsculos de Negri. [**A New Method for Staining Negri Bodies.**] *Semana Méd.* 1949, Aug. 11, v. 56, No. 32, 263–5, 1 fig.

The new method is a modification of that of Neri (1909). Neri's original method consisted of fixing the tissue in acetone and embedding in paraffin ; sections were stained for ten minutes in 1 per cent. eosin containing 0·1 gm. of iodine and 0·2 gm. of potassium iodide ; after washing in water the section was stained with 0·1 per cent. methylene blue for five minutes, then decolorized

to a lilac colour with 95 per cent. alcohol. The Negri bodies stain a red-violet, the nerve-cells blue with nucleoli dark blue, but the results were inconstant because of the decolorization by alcohol which takes place quickly.

The author modifies this in the following way : The fixative used is some form of corrosive sublimate, Lépine, Zenker, formol-sublimate, etc. The tissue is then stained in double strength Lugol's iodine (iodine 1 gm., potassium iodide 2 gm., distilled water 100 cc.) and 1 per cent. eosin mixed in equal parts immediately before use, the stain being allowed to act for 30–45 minutes, then washed in distilled water and stained with 0·5 per thousand methyl (not methylene) blue for three to five minutes for counterstaining, washed, dehydrated and mounted as usual.

The Negri bodies take on a brilliant ruby-red, the nerve and glia cells a cobalt blue. Methylene blue is a basic stain and will not colour decomposed cells or those which have undergone chromatolysis, for it is the tigroid body which takes the methylene blue ; methyl blue is an acid stain and so stains decomposed or chromatolysed cells. The Negri bodies are easily distinguished from the red corpuscles (they are not by the original Neri method) because the latter take on a brick-red colour in contrast with the ruby-red of the Negri bodies. *H. Harold Scott*

Pait, C. F. & Pearson, H. E. **Rabies Vaccine Encephalomyelitis in relation to the Incidence of Animal Rabies in Los Angeles.** *Amer. J. Pub. Health.* 1949, July, v. 39, No. 7, 875–7.

The authors report on nine cases (one fatal) of neuro-paralytic accidents which followed anti-rabies treatment with a Semple type vaccine (20 per cent. rabbit brain, ether-extracted, phenol-inactivated) among 5,500 persons vaccinated in Los Angeles during the seven years' period 1940–46. Such an incidence of 1 in 600 is among the highest recorded [*cf.* McCoy, 1 in 2,900 ; Horack, 1 in 1,200 : this *Bulletin*, 1931, v. 28, 252 ; 1939, v. 36, 730].

Other interesting figures given are in respect of 3,190 persons between 1912–47, bitten by dogs proved to have been rabid at the time of wounding. Of that number, eight died of rabies in spite of vaccination and 14 died without having been vaccinated.

As reckoned from these statistics the chances are : 1 among 140 bites reported is from a rabid animal ; and from 1 in 1,400 to 1 in 2,100 that a bitten person contracts rabies.

Animal passage experiments from the fatal cases of neuro-paralytic accident were, as is to be expected, consistently negative. Data as to a possible allergic history of the patients are not provided. Emphasis is laid on the desirability—in the absence of a vaccine free from paralysis-provoking factors—of carefully considering in each case whether or not anti-rabies vaccine should be administered. *G. Stuart*

Jervis, G. A., Burkhart, R. L. & Koprowski, H. **Demyelinating Encephalomyelitis in the Dog associated with Antirabies Vaccination.** *Amer. J. Hyg.* 1949, July, v. 50, No. 1, 14–26, 8 figs. [42 refs.]

The purpose of this article was to report four cases of encephalomyelitis in dogs after anti-rabies vaccination. In their successful attempt to produce neuroparalytic accidents in these animals the authors administered to each of a group of healthy dogs (30 of the St. Bernard and 60 of the Great Pyrenees breeds), which had previously been immunized by the Laidlaw-Dunkin method against distemper, one injection of 10 cc. of a 20 per cent. horse brain (inactivated with 0·5 per cent. phenol) anti-rabies vaccine. In 14 to 20 days thereafter

four dogs—all of the Great Pyrenees breed—developed paralytic symptoms. Of these, three were sacrificed when moribund and one, which had shown signs of partial paralysis on the 20th day after vaccination, survived, but still had, three months later, a residual paralysis, spastic in type, of the hind leg.

A detailed pathological examination was carried out on two of the dogs and nine photomicrographs (eight figs.) are published. Perivascular infiltration with lymphocytic and histiocytic elements, demyelination and gliosis were the main changes observed. Attempts to isolate the infectious agent by means of repeated subinoculations failed, and it is of interest to note that in no instance, on complement-fixation testing with rabbit and dog brain as antigen, were antibrain antibodies demonstrated. Thus although the virus origin of the condition was experimentally excluded, its possible allergic nature could also not be proved, inasmuch as antibrain antibodies, such as have been detected in the guineapig, were not found.

Demyelinating encephalomyelitis giving similar histological lesions may occur spontaneously in the dog and has been observed in the nervous form of canine distemper. Very interesting parallels to human encephalopathies are drawn, *viz.*, the spontaneously occurring type—acute multiple sclerosis ; the post-vaccinal type—following vaccination and anti-rabies treatment ; and the post-infectious type—following measles or mumps. *G. Stuart*

Sabban, M. S. El. **Cultivation of Pseudorabies Virus in the Yolk Sac of the Developing Chick Embryo.** *Proc. Soc. Exper. Biol. & Med.* 1949, July, v. 71, No. 3, 423–9, 4 figs.

In this paper the growth of the pseudorabies virus (Aujeszky) on the yolk sac membrane of the chicken egg has been studied : seven-day-old embryonated eggs used in the investigation were harvested immediately after death, which took place at first on the third day and at later passage levels in 40 hours. The yolk sac membrane was found regularly to provide an infectious titre of 10^{-6}, while the embryonic tissue and the chorio-allantoic membrane and fluid gave a titre one log. lower, except at first egg passage, when they titred only 10^{-3}. During adaptation of the virus to the chick embryo mortality rose gradually from 60 per cent. at the first passage to 80 per cent. after the fifth passage and to 100 per cent. from the twelfth passage on.

After the fiftieth egg passage, the virus failed to produce any skin lesions in the subcutaneously-infected rabbit, but, as commonly happens after intra-cerebral inoculation, paralytic symptoms made their appearance.

A detailed description of the pathology of the disease in chick embryos is given. Macroscopically, haemorrhages occurred, at the higher passage levels, over the entire skin surface. Microscopically, congestion and leucocytic infiltration of the brain, together with all stages of degeneration of central nervous tissue, were found. Mesothelial cells of the brain as well as the yolk sac membrane showed acidophilic intranuclear inclusions which were at first only in the form of granules but in later passages solid.

For the identification of the virus, a neutralization test with antiserum of known activity against rabbit-brain passage virus was employed. *G. Stuart*

PLAGUE

Chen, T. H. **The Behavior of *Pasteurella pestis* in Glycerin and Rhamnose Mediums.** *J. Infect. Dis.* 1949, July–Aug., v. 85, No. 1, 97–100. [24 refs.]

In a study of 53 strains of *Pasteurella pestis* from the collection in the University of California the author found that three were " glycerin positive ", producing acid in culture media containing glycerin.

From an analytical survey of the literature it is concluded that the glycerin-positive and glycerin-negative strains seldom occur together in the same region.

All but one of the many strains hitherto recorded from Manchuria, Mongolia, South-East Russia, Turkestan, and South Russia, have been glycerin-positive, whereas nearly all the strains from other parts of the world have been glycerin-negative.

The author admits that further studies are needed before the possible significance of this distribution can be gauged; he also mentions that some workers have found that glycerin-positive strains have become glycerin-negative after long storage or after subcultivation. *John W. D. Megaw*

PRZYBOROWSKI, T. **Rats from the Ports of Gdynia and Gdańsk (Poland).** *Bull. Inst. Marine & Trop. Med., Med. Acad., Gdańsk, Poland.* 1948, v. 1, No. 1, 13–16.

In a survey of 973 rats from the port of Gdynia and 786 from the port of Gdańsk, it was found that nearly 90 per cent. were *Rattus norvegicus* and the rest were *R. rattus*.

Among 62 rats taken on ships in the harbours only five were *R. norvegicus*. These surveys were made "up to October 1, 1947."

In the port of Gdynia, a previous survey made in 1938 gave quite different results; 50·6 per cent. of the rats were *R. norvegicus*, and 49·4 were *R. rattus*.

The explanation of the difference is believed to be the wartime cessation of seaborne traffic and the resulting interruption of the influx of *R. rattus* from ships. *John W. D. Megaw*

LINK, V. B. **Plague among Wild Rodents in Rio Arriba County, New Mexico.** *Amer. J. Trop. Med.* 1949, July, v. 29, No. 4, 493–500, 3 figs.

The author describes a thorough investigation, carried out between May and August, 1948, into the presence of plague infection in Rio Arriba County in New Mexico, on the Colorado border.

The County is 5,871 square miles in area, the population is 25,352. In 1939 no evidence of infection was found among 400 animals from 25 different areas of the County. In 1943 there were many deaths among the wild animals of one area, and since that time prairie dogs have been reported from time to time as disappearing, temporarily or permanently, from eight other areas, presumably as the result of plague infection.

In the present study 3,271 rodents belonging to 20 species, and 27 other animals, were trapped or shot; their ectoparasites were collected and examined.

The only rodent found infected was the prairie dog (*Cynomys gunnisoni*) of which 994 were examined. Plague infection was isolated from 15 pools of fleas collected from 211 of the animals, and from the tissues of three others.

From 32 marmots (*Marmota flaviventris*) two strains of infection were isolated; one of the strains was from a pool of 30 fleas collected from six of the animals, the other was from a pool of 33 lice collected from four animals. From the latter group of animals 19 fleas and five ticks were collected, but were found free from infection.

No cases of human plague have been known to occur in the County. The risk of human infection is regarded as small because of the absence of domestic rats. *John W. D. Megaw*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

GELIN, G. Retentissement cardio-vasculaire de l'amibiase chronique. A propos de 80 observations recueillies en un an en Oranie. [**Cardio-vascular Complications in Chronic Amoebiasis : 80 Cases collected in Oran in a Year.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1949, Nos. 21/22, 788–94.

HERNÁNDEZ VARGAS, C. R. Nuevo tratamiento de la amibiasis intestinal. [**A New Treatment of Intestinal Amoebiasis.**] *Rev. Facul. de Med.* Bogotá. 1949, Mar., v. 17, No. 9, 415–55. [16 refs.]

The " new treatment " here described is, in essence, a combination of drugs which have been tried singly with varying success. The author has divided his account into five chapters of which the first gives some data on the prevalence of infection by *Entamoeba histolytica* in Columbia between 1916 and 1943, and the second consists of remarks on ipecacuanha, emetine, E.B.I., arsenicals such as treparsol and stovarsol, and on yatren, vioform and diodoquin, culled from the literature and containing nothing new. Chapter III explains the rationale of the suggested treatment—the simultaneous administration of emetine, penicillin and sulphaguanidine. Originally, by what is called the Hargreaves method, in 1944, emetine hydrochloride was injected in a daily dose of 0·06 gm. for seven days, then 0·4 gm. till " the total in centigrammes was equivalent to the patient's weight in kilogrammes." If a second course was needed 45 days were allowed to elapse after the first. At the same time as the emetine there were injected 200,000 units of penicillin every day, divided into eight doses, at intervals of three hours for one week, and sulphaguanidine was given, 4 gm. four times a day (16 gm. daily) for a week, totalling 112 gm.

In 1947 this method was modified and the course consisted of three phases : i. Of six days during which there were given daily injections of 0·06 gm. emetine, together with one million units of penicillin in doses of 33,000 units every three hours, and 20 gm. of sulphaguanidine or sulphamethazine, 1 gm. every four hours. ii. Of 12 days ; emetine bismuth iodide 0·12 gm. (2 grains) every night and a retention enema of 4–6 oz. of chiniofon, 1–4 per cent. daily. iii. Of 20 days ; diodoquin 0·63 gm. three times a day. The patient may be up and about during the third phase, but in hospital for the first two. The author has slightly modified this procedure as follows : Days 1 to 6 : emetine hydrochloride, 0·06 gm. daily, preceded by injection of some cardiac tonic such as sparteine ; penicillin, 33,000 units every three hours to a total of 1,000,000 units, and sulphadiazine 1 gm. every four hours to a total of 20 gm. Days 7 to 18 : Daily retention enema of 4 oz. of chiniofon, 2–4 per cent., after a wash out with 2 per cent. sodium bicarbonate ; bismuth subnitrate in capsules containing 0·5–1 gm., three a day. Days 19 to 36 : Five tablets of diodoquin daily, two in the morning, one at mid-day and two at night, each containing 210 mgm.

The advantages claimed for this procedure are that the dose of emetine is reduced to a minimum compatible with efficiency and toxic symptoms are avoided ; the associated drugs act on the intestinal bacterial flora ; the iodides act on the cystic forms of the entamoeba and the bismuth counteracts the possible diarrhoeic action of the chiniofon.

Twenty cases are detailed, 16 males, four females, whose ages ranged between 17 and 60 years. Generally, symptoms showed improvement in six days. Sixteen patients were cured ; in four there was no benefit, at least no lasting benefit, but two of these suffered also from tuberculosis and two had a heavy infestation with hookworm. *H. Harold Scott*

MONNEROT-DUMAINE, M. Notions nouvelles sur le traitement de l'amibiase intestinale. **New Aspects of the Treatment of Intestinal Amoebiasis.** *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 295–303. 26 refs.]

Amoebiasis was an even more serious cause of morbidity in the armies of the 1939–45 war than in that of 1914–18, and it has been of a more severe type, especially in the prison camps in the East. With the dispersal of the patients after the war most doctors encounter it in their practices. The author strongly condemns the view that a diagnosis of amoebiasis should automatically be followed by a prolonged series of emetine injections; these may be without benefit and commonly are given unjustifiably and even to those not harbouring parasites. Emetine, though it is one of the best amoebicides, is a dangerous drug as its therapeutic dosage approximates to the toxic dosage. After reviewing the toxic action of emetine, the author states that a definite syndrome is evident in those repeatedly submitted to it for some time; they are pale and asthenic with a low blood pressure, they suffer dyspnoea and tachycardia on slight exertion, and they lack tone and energy, vigour and resistance; they suffer from diarrhoea; and there is loss of physical strength with some muscular wasting; the tendon reflexes are weak.

After considering favourably oral emetine treatment the author reviews other drugs, both old and new, in the treatment of amoebiasis. Synthetic chemical compounds resembling emetine, although active *in vitro*, have proved of little therapeutic value. The antibiotics and sulphonamides by controlling associated bacterial infections in the intestine are of benefit, though they are not themselves amoebicidal. The author has for long noticed that the appearance of bile in the stools of a case of amoebic dysentery is followed by cessation of the dysentery; he has successfully treated patients with a freshly prepared alcohol extract of bile after they have proved refractory to other treatments, and he considers this treatment of value and worthy of further attention. Kurchi and conessine are new and valuable specifics in refractory cases of chronic amoebiasis. Bismuth subnitrate is of value by virtue of the sedative action it exerts on the intestinal mucosa, and it may be given with other drugs to this end. The value of the arsenites (stovarsol and carbarsone) is still ill-defined; the iodized quinoline derivatives (chiniofon and vioform) are of great value particularly if given early, as they forestall the development of the chronic condition. Iodoform is a useful amoebicide when given orally, and trilactic acid has also been used with some success. The condition of the patient has an important bearing on his infection; well-nourished and otherwise healthy persons do not suffer the more severe form of the disease seen in the ill-nourished and debilitated, such as the inhabitants of prison camps. Ileostomy may be beneficial in neglected cases of infection with an extensively ulcerated gut, which have proved refractory to other treatments.

A. R. D. Adams

ANDERSON, H. H., JOHNSTONE, H. G., BOSTICK, W., PEÑA CHEVARRÍA, A. & PACKER, H. **Thioarsenites in Amebiasis. A Clinical Appraisal of New Amebacides.** *J. Amer. Med. Ass.* 1949, Aug. 20, v. 140, No. 16, 1251–6. [Refs. in footnotes.]

The halogenated hydroxyquinolines for oral adminstration (chiniofon, vioform, and diodoquin) have recently suffered reversals of the high opinions formed of them as amoebicides when they were first introduced. They are potentially toxic, as they are absorbed and have produced raised iodine blood levels. The arsenicals, carbarsone and acetarsol, are extensively used in the treatment of amoebiasis, but the latter often causes toxicity and so has been

abandoned in the United States in favour of the former. There are many cases of chronic amoebiasis among U.S. war veterans, some of whom have been subjected to unsuccessful treatment, others of whom have not. This fact and the general dissatisfaction with, and lack of agreement on, the current therapy of amoebiasis have encouraged the authors to search for a more effective amoebicide than any so far available.

The thioarsenite C.C. 906 (p-carbamidophenyl arsenous acid) (or carbarsone oxide) was the most effective amoebicide against *E. histolytica* discovered by laboratory test; although more than ten times as active as carbarsone (p-carbamidophenyl arsenic acid) it proved much more toxic, probably because the valence of the arsenic was three rather than five. Substitution of -SH groups for oxygen reduces the toxicity of arsenicals, and two such derivatives of carbarsone oxide, C.C. 914 (p-carbamidophenyl-bis (carboxymethylmercapto) arsine) and C.C. 1037 (p-carbamidophenyl-bis (2-carboxyphenylmercapto) arsine), proved less toxic to the tissues in amoebiasis of monkeys while largely retaining their amoebicidal activity *in vitro* and *in vivo*. These two compounds were subjected to clinical trial, in Tennessee and in Costa Rica, on 100 patients suffering from a variety of protozoal and helminthic infections. Of 82 patients (77 infected with *E. histolytica*, two with *Dientamoeba fragilis*, and two with *Balantidium coli*), treated with one or other of these compounds, 74 were freed of their parasites, as judged by 6–12 stool examinations during the ensuing four months. Another 18 patients (two infected with *D. fragilis*, 12 with *Strongyloides stercoralis*, one with *Fasciola hepatica*, two with *Leishmania tropica*, and three with *Treponema pertenue*) were similarly treated but without benefit. The dosages employed ranged from 3·0 gm. orally in ten days to 7·2 gm. in 24 days; the smaller dosage was just as effective as the larger; 13 patients with acute dysentery were given 3·0 to 6·0 gm. of C.C. 1037 in six days in retention enemata. No toxic side-effects were observed other than nausea and vomiting in 12 cases; coating the pills with phenyl salicylate obviated this. The authors conclude that these two thioarsenites are therapeutically effective amoebicides in doses 1/10 to 1/5 that of carbarsone, and they can safely be given orally thrice daily for ten days in enteric-coated tablets containing 25 to 50 mgm. of the drug; in severe cases of dysentery they may be given as retention enemata.

A. R. D. Adams

De la Garza Brito, A. & Treviño Villaseñor, A. Nota preliminar sobre la acción terapeutica de un nuevo amibicida. [**Preliminary Note on a New Amoebicide.**] *Medicina.* Mexico. 1949, July 10, v. 29, No. 583, 261–9.

[The question immediately arises to anyone reading this article, "When does a drug cease to be new?"] The drug referred to here is Win 1011, the amoebicidal action of which was proved by Hauer in 1943 [see this *Bulletin*, 1943, v. 40, 913, where it is called "Wia" throughout]. The name was given because the drug is a product of the Winthrop-Sterling Institute, Mexico. It contains approximately 37 per cent. of bismuth and 15·7 per cent. of pentavalent arsenic, and is put up in tablets of 0·25 gm. The authors give details of ten patients treated; one was given six tablets daily for ten days, one had four, but all the others received five daily for the ten days. Tolerance was generally good; there might be complaint of headache and a little colic or nausea, but not enough to cut short the treatment. At the end of the course, and often after four days or so only, no *Entamoeba histolytica* could be seen in the stools and proctoscopic examination was also negative.

H. Harold Scott

Luis Carri, E. Equivalente epileptiforme por giardiasis intestinal. [**Epileptiform Manifestations in Giardiasis.**] *Archivos Sec. Salud Publica de la Nación.* Buenos Aires. 1948, June, v. 3, No. 19, 57–60.

VÉGHELYI, P. V. & LÁNCOS, F. J. **Avitaminosis A in Giardiasis.** *Amer. J. Dis. Children.* 1949, Aug., v. 78, No. 2, 257–9, 4 figs.

" A child 28 months of age with keratomalacia of both eyes was demonstrated to harbor Giardia lamblia. He had steatorrhea, hypochromic anemia and low vitamin A content in the blood. The curves for both vitamin A absorption and dextrose tolerance showed exceptionally poor absorption of these materials.

" After the parasite had been eradicated, the absorption of both vitamin A and dextrose became normal, the excess fat disappeared from the feces, the patient gained much weight and his anemia greatly improved."

AUSTONI, M. & BOVO, G. Coccidiosi umana da *Isospora belli* (Wenyon) in anchilostomiasico. [**Coincident Infestation by** *Ancylostoma duodenale* **and** *Isospora belli*.] *Riv. di Parassit.* Rome. 1949, Sept., v. 10, No. 3, 143–52, 1 fig. [12 refs.] English summary (4 lines).

A woman of 34 years, employed with her husband in gardening, complained of vague abdominal pain and disturbance with weakness and diarrhoea. She, her husband, and five children all were harbouring hookworms and the patient herself was infected also with *Isospora belli* and *Trichuris trichiura*. A duodenal sound could not be used on account of an insuperable pyloric spasm. Treatment by thymol reduced both infestations. This was followed by chloroform and eucalyptus oil in castor oil, but the first dose of this caused " grave general disturbance ", so no more was given, but improvement was rapid and examination of the stools showed no more parasites. A strange fact is recorded but not explained ; the Wassermann reaction tested after the first upset from the chloroform and eucalyptus oil was strongly positive. When the trouble cleared the test was again carried out but this time was " completely negative ".

H. Harold Scott

LEPROSY

VALLE, S. O meio social leprógeno. [**Leprosy in its Social Aspect.**] *Rev. Brasileira Med.* Rio de Janeiro. 1949, June, v. 6, No. 6, 406–12.

This article is of the nature of a general talk on leprosy in Brazil, the ignorance of the masses concerning the disease, factors which influence its spread, in short, the epidemiology of leprosy in general terms. Concrete facts and speculations based on them are stated towards the end of the paper. It is stated that according to official returns there are 36 leprosy institutions in Brazil ; these include leprosaria, colonies, asylums, hospitals and sanatoria, and contain 20,923 patients. In addition to these there are some isolated in their homes and others at large on "provisional parole", which would bring the total to " about 21,000 " [this would allow only 77 for both the last groups]. The average number infected by each is taken [arbitrarily] as three, so that there may be said to be 63,000 likely to need internment in the future, or 84,000 infected, or latent, or potentially infective. Taking the total population as 45 millions, this would give 1 in 536. Next, the members of the family and social contacts in close touch are assumed to be 5 for each, or a total of 420,000, and these, together with the 84,000 above, mean that some 500,000 persons must be considered when the problem of leprosy prophylaxis comes under discussion.

H. Harold Scott

BECHELLI, L. M. & ROTBERG, A. Idade e lepra : estudo dos fatores exposição e resistência. [**Age and Leprosy ; a Study of the Factors of Exposure and Resistance.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Mar., v. 17, No. 1, 31–44, 2 figs. [56 refs.] English summary.

If we were to judge from statements in medical literature, say the authors, we would infer that childhood and early adolescence are the ages when leprosy is most often contracted, and this is explained [so far as it can be called explanation and not mere tautology] by saying that the young and immature body is more susceptible to infection. From a study of records from Hawaii, New Caledonia and Nauru Islands, and of the indigenous and immigrant population of São Paulo, they infer that the incidence, or rather the prevalence, depends not so much on age as on the degree of exposure to infection. Thus, in the islands mentioned, children and adults are about equally exposed ; in São Paulo, among the indigenous population the incidence in descending order was the 4th, 3rd, 5th, 6th, 2nd, 7th and 1st decades ; among the " foreigners " [immigrants] 5th, 6th, 7th, 4th, 3rd, 2nd and 1st.

For purposes of comparison the authors show by graphs the relative age-incidence of measles and conclude that " depending on an earlier or a later age of exposure and on the resistance of the individuals in contact with infectious foci, a higher incidence of the disease among children or adults will be observed."

H. Harold Scott

DE FARIA, J. L. Valor do método de Faraco para coloração do bacilo de Hansen em cortes. [**Value of Faraco's Method for the Staining of the Hansen Bacillus in Paraffin Sections.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Mar., v. 17, No. 1, 18–26, 2 figs. on 1 pl. [13 refs.] English summary.

Faraco's method of staining Hansen's bacillus has been regarded by some as a modification of the Ziehl-Neelsen procedure, but this is not a correct view. The principle consists in treating the section, before staining with fuchsin, with some fatty or oily substance—liquid paraffin, cod-liver oil, Singer's machine oil—to make up for the fat removed in passing the tissue through alcohol and xylol. The method is as follows :—

Fix the tissue in 10 per cent. formalin, then pass in the usual way to embedding in paraffin. Cut sections 4–6μ in thickness, remove the paraffin with xylol and then pass through alcohols to water. Deposit Merck's liquid paraffin on the section and heat till steam rises ; allow to cool ; blot with filter paper till the section becomes opaque ; stain with hot acid fuchsin, as by the Ziehl-Neelsen method ; wash in water, then in liquid soap, pure or a little diluted ; wash well in water and pass rapidly through alcohol 70 per cent. ; wash again in water, differentiate in 25 per cent. sulphuric acid till the section is a light red on washing in water ; wash in running water for at least 10 minutes ; stain lightly with methylene blue so that the section appears a reddish-blue, not a pure blue ; then pass through alcohol and xylol and mount in neutral balsam.

Tissue from 36 patients whose lesions showed very few bacilli were stained by the Ziehl-Neelsen and by the Faraco techniques ; 10 were positive by the former, but 14 by the latter, and when organisms were seen by both the numbers were much greater by the Faraco technique. The author found also that organisms present in old lesions might have lost much of their acid-fastness and so be recognizable only with difficulty by the Ziehl-Neelsen technique, whereas this property seemed to be restored by the Faraco method.

H. Harold Scott

DE SOUZA-ARAUJO, H. C. Estudo bacteriológico de escarros de leprosos-tuberculosos em tratamento com a estreptomicina, com exibição das culturas obtidas. [**Bacteriological Study of Sputa of Tuberculous Leprosy Patients treated with Streptomycin.**] *Hospital.* Rio de Janeiro. 1949, May, v. 35, No. 5, 755–6.

In 1941 the author recorded the results of examination of the sputa of patients suspected of being also tuberculous and obtained positive culture in nearly one in three. In the next two years he obtained an even higher proportion (43 per cent.). In the Curupaity Colony many advanced cases also tuberculous were treated with streptomycin. Sputa of some of these were cultivated on Loewenstein's medium and three out of 12 gave a growth after 15 days; the specimens had been kept for a week in an ice-chest and it was thought that this delay might have affected the growth, so fresh specimens were asked for and cultured at once; in 15 to 30 days 11 had given a growth and so had eight more of the first lot. The remaining negative of the first lot continued negative. Other specimens, 14 in all, were cultured and 13 gave characteristic growths of *Myco. tuberculosis* of the eugonic type. Streptomycin had no effect on the pulmonary organisms of these patients. Three of the patients giving a growth of *Myco. tuberculosis* gave also growths of chromogenic acid-alcohol-fast organisms such as the author has already obtained from leprosy patients. These are to be specially studied and will be reported upon later.

H. Harold Scott

BUDIANSKY, Estella. Comportamento da alergia tuberculínica em filhos de leprosos, após Calmetização. [**Allergic Response to BCG by the Children of Leprosy Patients.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Mar., v. 17, No. 1, 27–30.

The author tested 168 children of leprosy patients, ranging in age up to 24 years, by the Mantoux test, using O.T. 1/1,000, 1/100 and 1/10, regarding as negative those failing to respond to the last dilution; 70 (41·6 per cent.) proved positive, 98 negative. The Mitsuda test was made with injection of 0·1 cc. of lepromin and the result read 21–30 days later; 94 per cent. reacted among those tuberculin-positive and 92·9 per cent. of those tuberculin-negative.

Eighty-six of the tuberculin-negative were given a single dose *per os* of 20 cgm. of BCG and a month later 82 of them were tested by the Mantoux test, 1/100, and, if negative to that, 1/10. Fifty (60·9 per cent.) were positive. When 76 of them were tested again a year later, only 27 (35·5 per cent.) were positive, 49 being negative.

By way of comparison, 173 of the inmates of an orphanage, whose ages ranged between 4 and 17 years, were similarly tested with tuberculin; 103 (59·5 per cent.) were positive; the other 70 were given BCG and 45 of these were tested for allergy to tuberculin one month and again one year afterwards; 70·7 and 73·3 per cent. respectively were positive.

The author concludes that the children of leprosy subjects, Mitsuda positive, react to tuberculin in about the same proportion as is found among non-leprous persons, that is, there is no "group sensitization" due to the presence of *Myco. leprae*; further, allergy resulting from BCG in children already sensitized to *Myco. leprae* is more transient than that found in the general population (as evidenced by the orphanage children). In fact, "allergy to lepromin previously set up, far from favouring allergy to tuberculin, exercises in the body a certain anergizing action, evidenced when one tests the tuberculin allergy of mild intensity, such as that produced by BCG."

H. Harold Scott

DE AQUINO, U. M. Observação e discussão de um caso de lepra tuberculoide Mitsuda-negativo ; reação focal despertada pela tuberculina. [**Observation and Discussion of a Case of Tuberculoid Leprosy, Mitsuda-negative ; Reaction brought out by Tuberculin.**] *Hospital.* Rio de Janeiro. 1949, May, v. 35, No. 5, 745–53, 2 figs. [14 refs.]

A Brazilian white man, 25 years of age, who gave no family history of leprosy but who had married a woman with the clinically diagnosed lepromatous form of the disease, presented himself with a 5-months' history of symptoms : when examined, he showed maculo-erythematous, hypochromic and achromic patches with clear edges but covering fairly large areas on the trunk and limbs, and anaesthesia to heat and pain over the areas supplied by the cubital, popliteal and peroneal nerves ; the hands were amyotrophic (main-en-griffe).

Bacteriologically, the nasal mucosa and skin from various sites were negative ; the early Fernandez and the late Mitsuda reactions were both negative. An intradermal Mantoux reaction was then tested with tuberculin 1 : 10,000 and in 24 hours there was a local infiltration 25 mm. in diameter and a general reaction in all the leprides, especially marked in those of the forehead, and there was systemic disturbance ; in 48 hours the local erythematous infiltration had reached 30 mm. ; after this the general disturbance began to improve, the local reaction was disappearing after 4 days, but the "lesion reactions" have persisted "up to the present" [interval not stated]. *H. Harold Scott*

ZAVALIA, A. U. Ação das diamino-difenil-sulfonas sobre as complicações oculares da lepra. [**Action of Promin on the Eye Lesions of Leprosy.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Mar., v. 17, No. 1, 5–17.

Much useful information may be gained even from negative results of an experiment. In view of the favourable reports on the use of Promin in leprosy the author has tested this compound in 25 leprosy patients, whom he divided into 4 groups. Each patient received 100 intravenous injections over a period of 4 months ; the injection was given daily, except on Sundays, the first dose being 5 cc. or 2 gm. of the drug, and the subsequent doses 12·5 cc. (5 gm.), with a 30 days' rest after the course.

Group I, 5 patients, suffering from the lepromatous form in an early stage, or the indeterminate type, but without any ocular lesions. Each patient received about 1,200 gm. (stated as 1,184±285) during a period of 14 months or so, average 14·20±2·49 months. In none of them did any eye complications occur ; one improved clinically, but not in any other way, *i.e.*, bacteriologically no change could be detected. Group II, 7 patients, with moderately advanced lepromatous stage (L_2) and slight ocular lesions, some infiltration of the cornea and thickening of the circum-corneal nerves. These received 1,207±267·5 gm. of Promin over a period of 13·86±3·08 months. Three showed a distinct improvement in the eye condition, disappearance of thickening of the nerve-ring and partial resorption of the infiltration ; in two there was no change and in the other two a nodular iritis and extension of the lesion to the anterior part of the uvea. Group III, 5 patients, in a more advanced stage of L_2 and more severe eye lesions with nodular iritis. They received 1,160±147·1 gm. of Promin during a period of 11·80±2·86 months. Of these, in one the condition remained stationary ; in the others the miliary nodules increased in number and, in short, they became worse. Group IV, 8 patients, with a more advanced lepromatous form (L_3), and more severe eye complications, keratitis, nodules in the iris and diffuse irido-cyclitis. The ranges of dose here seem to have been greater, for the author states that they received an average dose of only 934±317·2 gm., because the degrees of tolerance were so varied, and the

average duration of treatment was 12·2±4·09 months. In 6 of the 8 the ocular lesions became definitely worse, the nodules increased and the irido-cyclitis extended ; in one the condition remained unchanged and in one only was improvement observed both in the interstitial keratitis and the acute irido-cyclitis present. We can only conclude, therefore, that Promin will not arrest or delay the development of the slow and progressing ocular lesions of leprosy.

H. Harold Scott

Guadagnini, M. La cirugia en la lepra. [**Surgery in Leprosy.**] *Archivos Sec. Salud Publica de la Nación.* Buenos Aires. 1948, Aug., v. 4, No. 2, 139–51, 11 figs. [17 refs.]

Guadagnini, M. A. El tratamiento quirúrgico de las neuritis hipertróficas de la lepra. [**Surgical Treatment of Hypertrophic Neuritis in Leprosy.**] *Archivos Sec. Salud Publica de la Nación.* Buenos Aires. 1947, Feb., v. 1, No. 3, 4–13, 7 figs. [10 refs.]

Enlargement of certain nerves, notably the cubital, the external popliteal and the median, is commonly observed in leprosy. In this enlargement there are three stages of evolution. The first, in which the acuteness of the pain leads to the limb being kept semiflexed and as immobile as possible, because movement increases the pain. In addition to the pain there is hyperaesthesia with formication, weakness and slowness of muscular movement. The second in which the pain is on the whole less intense and less persistent, but occurs in exacerbations and signs of wasting of muscles appear ; in the third, the amyotrophy is marked, with functional incapacity, but no pain.

Surgical intervention is useful in the first two stages, not in the third. Operation consists in freeing the swollen nerve from its sheath and the fibrous epi- and endo-neurium. The stages are well shown in a series of photographs. The results are reported of 77 patients thus treated. In 72 the pain was completely relieved ; in 30 the nerve-function improved ; in 33 there was no change in this respect. Of 54 in whom the cubital nerve was thus dealt with 21 obtained improved function with disappearance of the pain ; 28 lost their pain but functionally there was no change ; in 5 the pain returned. Of 10 with external popliteal involvement, 7 had no more pain and the function improved ; in the other 3 function was unaffected although the pain disappeared. Four had median nerve involvement ; all lost their pain, but in two only did the function improve ; it remained unaffected in the other two.

H. Harold Scott

HELMINTHIASIS

Loughlin, E. H. & Spitz, S. H. **Diagnosis of Helminthiasis.** *J. Amer. Med. Ass.* 1949, Apr. 9, v. 139, No. 15, 997–1000. [Refs. in footnotes.]

Stoll estimates that there are 72 million tapeworm, 148 million fluke, and 2,000 million roundworm infections in the world [this *Bulletin*, 1947, v. 44, 667]. A not insignificant percentage of these is encountered in the United States and Canada. Since the return of servicemen a number of foreign species have been introduced into these countries, *e.g.*, 1 in 15 men from the Pacific area were infected with *Ancylostoma duodenale*, and many had schistosomiasis.

For examination of faeces the authors describe a concentration method (CEX). To 56 ml. of isotonic saline, 4 ml. of stool and 8 drops of laboratory aerosol (diocytyl sodium sulpho-succinate N.F.) are added. This is well mixed

and kept overnight, and shaken again: 1·5 ml. is now placed in a 15 ml. pointed centrifuge tube, to which 3·5 ml. isotonic saline, 5 ml. ether and 2 drops of xylene are added. This is shaken well and centrifuged at 2,000 revolutions per minute for 1½ minutes. The débris is wiped away and the supernatant fluid poured off. One or two drops of saline are added to the deposit which is placed on a slide by means of a pipette and examined. The whole sediment represents 0·1 gramme of faeces.

The authors propose a "diagnostic plan" which consists of a careful geographical history, naked-eye inspection of faeces passed without a cathartic, followed by a direct watery smear of a selected portion, a CEX concentration as described above, a cellulose tape and smear for *Enterobius*, charcoal culture of the stool, proctoscopy, and rectal biopsy.

In discussing the differential diagnosis they emphasize that each worm infection may mimic many serious organic maladies. They issue a warning, however, that the finding of an helminthic infection does not exclude co-existing organic disease. *L. E. Napier*

Marill, F. G., Hofman, M. & Bertozzi, P. Le foyer de bilharziose urinaire de Fondouk (Algérie). [**The Focus of Urinary Schistosomiasis in Fondouk (Algeria).**] *Arch. Inst. Pasteur d'Algérie.* 1949, June, v. 27, No. 2, 110–27, 1 map & 8 figs. on 4 pls.

The first focus of *Schistosoma haematobium* infection in Algeria was found in 1939 [this *Bulletin*, 1940, v. 37, 150, 483]; the existence of a second at Fondouk has now come to light. This evidence of spread of the range of the parasite in Algeria is the more significant now that extensive irrigation schemes are being undertaken. The water courses, reservoirs and irrigation distribution, and the climatic and geological conditions in the Fondouk area are described in detail.

Investigation has revealed 67 cases of urinary bilharziasis in Fondouk; two of the sufferers were Europeans, the rest Mussulmans; all were males ranging in age from 8 to 50 years, the highest incidence of infection being in the younger patients. All the patients were infected by bathing in the river Hamiz, which has been dammed to form an irrigation reservoir, and it would appear that the infestations date from the summer of 1946. Specimens of *Physa acuta*, *Bulinus contortus* [*truncatus*], and *Planorbis metidjensis* have been found in the area.

The possibilities for spread of the infection obviously are great, and measures are suggested to limit it.

[This paper should be consulted in the original by those interested.]

A. R. D. Adams

Meeser, C. V., Ross, W. F. & Blair, D. M. **Further Observations on the Macroscopic Diagnosis of Urinary Schistosomiasis.** *J. Trop. Med. & Hyg.* 1948, Mar., v. 51, No. 3, 54–9, 3 figs.

In this paper the authors describe in detail their reconstruction and use of the miracidiascope with its optical arrangement, originally designed by Gorman and the present authors [this *Bulletin*, 1948, v. 45, 258]. They discuss its use in the diagnosis of urinary schistosomiasis.

The miracidiascope consists of a specially constructed wooden rack painted dull black to hold centrifuge tubes and a hand lens, 1 in. in diameter and of 2½ in. focal length, to view the miracidia swimming about in water.

The value of the instrument is two-fold.

(1) The procedure is relatively simple and an opinion as to the presence of the disease can be given in an outstation clinic or during a routine school inspection without costly apparatus or specialized training.

(2) It can be employed in the determination for viability of ova. There are certain microscopic criteria of viability, but this macroscopic method may be used in addition for this purpose.

Many useful practical points in the preparation of specimens are discussed : these should be read in the original.

The terminal portion of the urine voided is collected and allowed to stand for approximately 30 minutes, after which the upper part is decanted, leaving sufficient behind to fill a centrifuge tube. This is centrifuged at low speed and the liquid gently drained off. Five ml. of water (either filtered and boiled pond or rain water) are added to the deposit. The tube is then inserted into one of the holes provided in the rack. Hatching is usually complete within 20 minutes, but may be delayed up to 40 minutes. If viable ova are present in the urinary specimen, these hatch and the miracidia can be seen through the lens swimming around actively in the water.

The authors conducted comparative trials with the miracidiascope and the already established microscopic technique. Of 1,300 specimens of urine examined, 299 (23 per cent.) were positive for ova microscopically and 246 (19 per cent.) by the miracidiascope. In 211 (16 per cent.) the infestation was recognized by both methods. Diagnosis was established on miracidial hatching alone but not microscopically in 35 cases, whereas in 88 it was made microscopically, but no miracidia were seen to hatch. In 11 of these 88 cases the ova were non-viable. [The paper is illustrated by two photographs and one figure of the miracidiascope.] *M. Gelfand*

Gönnert, R. Die Struktur der Körperoberfläche von *Bilharzia mansoni* (Sambon 1907). [**Structure of the Body-Covering of** *S. mansoni*.] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. [1949], v. 1, No. 1, 105–12, 4 figs.

Looss's classical work on the anatomy of *Bilharzia haematobia* was published in 1895 ; it was not until 1907, however, that a distinction between *S. haematobium* and *S. mansoni* was recognized, and there appears to be little doubt that Looss's description of the body-covering in the genus *Schistosoma* was founded on a study of material containing a mixture of both these species. The author of the present paper has had the opportunity of studying material obtained from mice infected with *S. mansoni* and killed after treatment with " Miracil ". [He makes no reference to the possibility that the drug may have altered the normal appearance of the worms.] The observations recorded are confined to this species, and the results obtained from the investigation have confirmed and amplified Looss's findings ; particularly as regards the interlocking of the spines on the overlapping edges of the gynaecophoric canal, so that this structure remains closed without muscular effort on the part of the male.

The author's observations are limited, for the main part, to meticulously careful and exact descriptions, accompanied by excellent diagrammatic drawings, of the morphology and anatomical distribution of the various types of spines occurring on the body-covering of both sexes of *S. mansoni*. *R. M. Gordon*

Vogel, H. & Minning, W. Hüllenbildung bei Bilharzia-Cercarien im Serum bilharzia-infizierter Tiere und Menschen. [**Membrane Formation in Schistosome Cercariae placed in Serum of Animals and Man infected with Schistosomes.**] *Zent. f. Bakt.* Abt. I. Orig. 1949, v. 153, 91–105, 4 figs. [17 refs.]

In 1940, the authors investigated the survival time of Schistosome cercariae placed in serum obtained from immune and control animals, and observed that

a membrane was formed around those cercariae which had been placed in immune serum, but was absent from those immersed in control serum, a phenomenon referred to by the authors as the "*Cercarienhüllen Reaktion*" or CHR test. The subject was reinvestigated in 1947, and it is with the results then obtained that the present paper is concerned. The technique of carrying out the CHR test is very simple: it essentially consists in mixing together on a slide a drop of the serum to be tested and a drop of water containing a concentration of living cercariae, usually 30–50. The reaction was shown to be non-specific, but it was found that *S. mansoni* cercariae tended to give the strongest reaction when tested against the sera of mammalian hosts, regardless of whether these were infected with *S. japonicum*, *S. haematobium* or *S. mansoni*.

A well-marked +++ positive reaction is characterized by the appearance, within 1–2 minutes of immersion, of a narrow, clear zone, which is in reality a homogeneous membrane, surrounding the cercariae. This membrane rapidly increases in distinctness and depth, to 3μ or wider, while the previously smooth edge becomes contoured. In less well-marked (++ and +) reactions, the time taken for the reaction to develop is longer and the membrane produced is thinner and less distinct in outline. Having recorded by this means the reactions given by the sera obtained from a large number of infected animals—monkeys, dogs, cats, mice and rabbits—and from a few human infections, the authors repeated the observations using various dilutions of the serum, and ascertained the highest dilution, the end point, at which the reaction was observable. The combined results of these two investigations are given as follows: A strong +++ positive reaction is characterized by the formation of a membrane not less than 3μ in depth, and the highest dilution of serum in which a reaction can be noted is 1 : 80 to 1 : 160. A moderate ++ positive reaction is characterized by the production of a membrane 2–3μ in depth, and an end-point in the serum dilution of 1 : 40. Distinct but less well-marked reactions are classed as weak (+) positive reactions. A drop of dried blood may be substituted for the serum: this technique sometimes gave results similar to those obtained with the serum, but on some occasions the result was negative when the serum reaction was positive, and for this reason the method was abandoned as unsatisfactory. It was observed that inactivated serum gave the same results as normal serum, and that cercariae killed by heating to 56°C. gave a positive reaction, whereas those heated to 100°C. did not do so.

With the use of the CHR technique already described, a large series of infected and uninfected animals was examined. The results obtained are recorded in the paper in detail, but they may be summarized by saying that with the exception of mice, all animals infected with any one of the three species of human schistosomes and found negative before infection, gave a positive reaction at an early stage after the infection was established. On the other hand, among 3 monkeys, 7 dogs, 13 rabbits and 20 mice found free from all forms of trematode infections, one rabbit and one dog gave a positive CHR reaction.

As regards human infections, the sera of seven patients excreting Schistosome eggs, or having excreted them one to five months previously, all gave a positive CHR. The sera of five patients, who had previously been infected but who for the past five years had been symptomless and were no longer excreting eggs, were negative. A control test carried out on 157 residents of Hamburg in whom the possibility of schistosome infection could be dismissed gave no positive results, except in one instance where the serum gave a feeble positive reaction on the first examination and was negative on subsequent examinations. [This case is omitted from the authors' summary.]

The authors produce evidence to prove that the membrane formed around the cercariae is not derived from any outpouring of fluid from the cephalic glands, the latter resulting in a granular mass, sometimes visible inside the clear membrane characteristic of the CHR reaction. They cannot state how the membrane originates, but they postulate that it arises from certain constituents occurring in the serum of animals infected with schistosomes coming into contact with fluid diffusing through the cuticle of the cercariae. The authors were, at first, of the opinion that the membrane they described might affect the ability of the cercariae to develop in the final host, and that it might be responsible for the immunity to superinfection which was observed in a proportion of the animals giving the reaction. Further observations and experiments, which are fully described, have caused them to alter this opinion, and they now consider that the membrane is in no way responsible for acquired immunity to schistosomiasis. Reference has already been made to the fact that the CHR reaction cannot be used to distinguish the species of schistosome involved, and the authors carried out a further series of experiments to try to determine its limits more clearly. No reaction was obtained with the sera of animals and persons infected with various species of tapeworm, nor with the sera of two cats infected with *Ophisthorchis felineus*. On the other hand, the sera of cattle infected with *Fasciola hepatica* gave a ++++ positive CHR when tested against schistosome cercariae. This lack of specificity is a disadvantage, but the authors consider that the results so far obtained by them suggest that the test might prove of value in diagnosing human infections, and urge that it should be investigated further.

[The paper adds considerably to our knowledge of the serology of trematode infections and should stimulate further investigations along the lines suggested by the authors.] *R. M. Gordon*

Schwetz, J. Sur une nouvelle classification des Planorbes du Congo Belge. Resp. de l'Afrique éthiopienne. [**A New Classification of *Planorbis* in the Belgian Congo.**] *Ann. Soc. Belge de Méd. Trop.* 1949, Mar. 31, v. 29, No. 1, 37–65, 20 figs. on pl.

The author points out the impossibility of satisfactorily studying the epidemiology of malaria or trypanosomiasis without an accompanying knowledge of their vectors, and that a similar knowledge, of at least certain groups, of molluscs is necessary when investigating the epidemiology of schistosomiasis. When the malariologist wishes to determine the species of any anopheline with which he is concerned, he follows the well-recognized rules for mosquito identification, which have been prepared by expert entomologists and, if still in doubt, he can rely on the opinion of a " recognized authority ", while similar facilities are available to the research worker studying the tsetse in trypanosomiasis. Professor Schwetz points out that " novices in malacology ", amongst whom he modestly includes himself, are in no such fortunate position ; not only are the tables of classification neither clear-cut nor well-recognized, but the experts may differ amongst themselves regarding the classification of a particular specimen or group of specimens. In support of this latter statement, the author remarks that having encountered difficulty in making a differential diagnosis between certain specimens he sought the opinion of two malacologists. " *La réponse fut tres intéressante* : *Pl. salinarum d'après un, et Pl. adowensis, d'après l'autre.*"

Professor Schwetz writes that it ill becomes the novice in a particular science to criticize the specialist, but most workers will agree with his view that the present system of classification of snail vectors is much too artificial and that it should be modified and simplified. The author considers that the undue

complexity of the present system has resulted, in part at any rate, from too little attention having been paid to the constantly changing morphology which accompanies growth in molluscs, and which is further influenced by food supply and environment ; he points out that these difficulties do not beset the entomologist, who is concerned with creatures which, for the main part, undergo but little change after they have reached the adult stage. [The author might well have added that the entomologist bases his classification on the complete specimen whereas the malacologist is often asked to base his classification on the shell only. ABBOTT (this *Bulletin*, 1948, v. 45, 1096).]

During recent years, the author has made a special study of the *Planorbidae* of the Belgian Congo ; not only has he studied the collections of other workers in various parts of the world, but he has carried out extensive surveys in the field, and has maintained and bred many species of the schistosomiasis vectors under artificial conditions. As a result of these studies, and with the approval and co-operation of Dr. J. Bequaert, he suggests a simplified classification and considers that the *Planorbidae* of the Belgian Congo should be classified and named as follows :—

1. *Biomphalaria alexandrina* var. *pfeifferi* (Krauss 1948) ;
2. *Biomphalaria alexandrina* var. *tanganyicensis* (E. A. Smith 1881) ;
3. *Biomphalaria alexandrina* var. *stanleyi* (E. A. Smith 1888) ;
4. *Biomphalaria alexandrina* var. *choanomphala* (von Martens 1879).

For doctors, veterinary surgeons and others who are not familiar with the terminology of the malacologist, the classification can be simplified and modified as follows :—

1. *Pl. pfeifferi* : shell of moderate size, more or less globulose, and without a keel. Occurs in streams, ponds and marshes.
2. *Pl. tanganyicensis* : large flat shells without a keel. Occurs in Lake Tanganyika.
3. *Pl. stanleyi* : shell of moderate size, globulose, with a keel on one side only. Occurs in Lakes Kivu, Edward and Albert.
4. *Pl. choanomphalus* : shells higher than *Pl. stanleyi*, with a prominent keel on both surfaces. Occurs in the same three lakes as 3.

The reasons for this classification, which the author admits may err on the side of over-simplification, are set out fully in the text, and should be consulted in the original by those who are interested. *R. M. Gordon*

SCHWETZ, J. Note préliminaire sur le rôle probable joué par toutes les variétés des Planorbes congolais, resp. de l'Afrique éthiopienne, dans la transmission de *Schistosoma mansoni* (Bilharziose intestinale). [**Preliminary Note on the Rôle of All Varieties of *Planorbis* in the Belgian Congo in the Transmission of *Schistosoma mansoni*.**] *Ann. Soc. Belge de Méd. Trop.* 1949, Mar. 31, v. 29, No. 1, 67–71.

The snail usually called *Planorbis adowensis*, but which the author considers to be *Pl. pfeifferi*, is the most important vector of intestinal schistosomiasis in the Congo region [this *Bulletin*, 1940, v. 37, 482] ; on the other hand, very little is known concerning the part played by *Pl. tanganyicensis*, *Pl. stanleyi*, or *Pl. choanomphalus*. During an expedition undertaken to the Congo in 1946, bifid-tailed cercariae, corresponding in morphology to *Schistosoma mansoni*, were found in all of the above-mentioned species, the proportion of snails found infected varying in the three species according to the site of the collection. The absence of infection amongst *Pl. stanleyi* obtained at Goma and amongst *Pl. pfeifferi* collected at Kibuye is attributed to the fact that the snails dissected were very young specimens. *R M. Gordon*

Coêlho, B., Menezes, H. & Magalhães, A., Jr. Esquistosomíase mansoni experimental. Lesões hepáticas de cobaios infestados e submetidos a tratamento pelo tartarato de sódio e antimonila. [**Experimental** *Schistosomiasis mansoni*. **Hepatic Lesions found in Infected Guineapigs treated with Sodium Antimony Tartrate.**] *Rev. Brasileira Med.* Rio de Janeiro. 1949, June, v. 6, No. 6, 378–83, 12 figs. English summary.

For their experiments the authors infected 20 [? 24] guineapigs with cercariae of *S. mansoni*; 8 were given Stibetin (sodium antimony tartrate) intramuscularly in doses ranging between 0·08 and 0·7 mgm. per gm. body-weight, *i.e.* 5–20·8 mgm. average dose and totals of 45 to 375 mgm. Sixteen were given the drug intraperitoneally in physiological saline, and some of them received a second course after an interval of 20 days. Four animals died after treatment, the others were killed at different intervals and their tissues were fixed in 10 per cent. formalin for histological examination. Five others were infected but left untreated as controls and killed at intervals between 59 and 105 days after infestation.

The tissue changes are described and depicted in a series of photographs for the macroscopical changes and photomicrographs for the histological. It was found that the worms were killed by the drug and the presence of the dead worm gave rise to nodules, accompanied in places by necrosis of the tissue. Within the vessels an endophlebitis was set up which acted as a barrier to the penetration of the decomposition products. If, however, the worm had broken through the vessel wall to the parenchyma of the organ it caused the tissue to necrose. The fibrosis resulting from the necrotic foci, if it reached the surface of the liver, would, by contraction, produce a granular appearance of the surface. This is well shown in two of the figures. *H. Harold Scott*

Vogel, H. Ueber eine Dauerzucht von *Oncomelania hupensis* und Infektionsversuche mit *Bilharzia japonica*. [**Maintenance of** *Oncomelania hupensis* **and Experimental Infection of it with** *Schistosoma japonicum*.] Reprinted from *Ztschr. f. Parasitenk.* 1948, v. 14, 70–91, 8 figs. [10 refs.]

For a laboratory investigation of any one of the three forms of schistosomiasis occurring in man, it is necessary to have continued breeding of the snail host. In the case of *S. mansoni*, the author has maintained a strain of *Australorbis glabratus* for more than sixteen years and a strain of *Planorbis pfeifferi* for several years, and has found that both these species of snails are easy to infect and give a plentiful supply of cercariae which readily cause infection in the final host. In the case of *S. haematobium*, the author has maintained a strain of *Physopsis globosa*, originally imported from Sierra Leone, but, although development of the miracidia takes place in this species, he has experienced difficulty in infecting laboratory animals with the resultant cercariae and, in common with most other workers in Europe, he has failed to maintain any particular strain of *S. haematobium* for more than a few generations. On the other hand, the author has found no difficulty in constantly maintaining *S. japonicum* in the laboratory, using a strain of *Oncomelania hupensis*, which he imported from China ten years previously. Once the technique has been learned, the breeding of this snail offers no particular difficulties, but Vogel has heard that other workers have not been so successful, and in order to help them he describes in considerable detail his methods of rearing and infecting the snail and maintaining the parasite in laboratory animals.

O. hupensis, which breeds in canals in China, seldom leaves the water during spring and autumn, but under unfavourable conditions in both summer and

winter, it migrates to the land, where it lives in small cavities between grass roots and stones. Unlike the other snail hosts of the schistosomes, *O. hupensis* does not breed throughout the year, but only during spring and early summer ; in addition, its eggs are laid singly, not in masses, each egg being enclosed in a covering of fine mineral slime. This covering acts not only as a mechanical protection, but it also forms an efficient camouflage ; hence, although it was certain that the eggs were being laid in the aquaria, for young snails were appearing regularly, it was only after two years of breeding in the aquaria that the eggs were discovered. It would appear that this fine mineral slime is derived from a clay occurring in the normal habitat and that it is essential for oviposition. Without such clay, the snails will not readily breed in artificial aquaria, and under natural conditions in China the snail disappears, as does schistosomiasis, when one changes from heavy clay ground to sand or gravel. The young snails hatch from the eggs within a fortnight and, under favourable conditions, they develop very rapidly, some becoming full-grown within three months of hatching. The length of life of *O. hupensis* was not observed ; it is probably similar to that of *O. nosophora*, which is stated to live for five years or possibly longer.

O. hupensis is easily infected with the miracidia of *S. japonicum* ; the rates of infection in seven series of experiments lay between 23·6 and 80 per cent. It tolerates infection well, and it may continue to shed cercariae for as long as a year. An interesting observation recorded in this part of the work is that *O. hupensis* infected with a single miracidium did not supply fewer cercariae than did those which had been exposed to many cercariae ; probably because the digestive gland of the snail only offers sufficient food for the development of a limited number of sporocysts. Dogs, usually sheep dogs, were found to be the most satisfactory final hosts, and in order to ensure that both sexes are represented among the adult schistosomes developing in these animals, it is advisable to use cercariae from a number of snails ; eight to eleven is the number recommended.

This paper contains exact instructions, often illustrated with clear diagrams, concerning the maintenance of *O. hupensis* and the methods for its infection, and it will prove invaluable to anyone endeavouring to maintain a strain of *S. japonicum* under laboratory conditions. *R. M. Gordon*

Sédallian, P., Maral, R. & Perrin, A. Epidémie familiale de distomatose à " Fasciola hepatica". [**A Familial Epidemic of Distosomiasis due to Fasciola hepatica.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1949, Nos. 9/10, 327–33.

The authors are encouraged to report this familial outbreak of distosomiasis due to *Fasciola hepatica* by the comparative rarity of human infection with this worm. The aetiology was classical in that the patients had been eating watercress from a field in which infected cattle were kept. Women and children only were affected. All were treated by glucantime (antimonate of N-methyl-glucamine), with good results, but no claim is made that this drug is better than other anthelmintics, many of which are effective on account of the weak hold that this infection has in man.

The five cases are reported in detail. The onset and symptomatology were very similar in all the cases ; it was usually gradual with malaise, shivering, periodically fever, usually low, and a non-productive cough. In every case there was epigastric pain at the onset or later.

There was albumin, usually a trace only, in four of the five cases, either before or after treatment had been started ; the amount increased during

treatment in two cases. The blood showed a slight degree of anaemia—3·6, 3·9 and 4·4 millions of red cells per cmm. and an eosinophilia of 30 to 40 per cent. except in the case of the elderly woman who died.

Ova of *Fasciola hepatica* were found in only two of the patients, in one after treatment had been commenced, both in faeces and in bile obtained by duodenal intubation.

Treatment was by intramuscular injection of glucantime daily for 12 days in doses of 4·5 grammes for the woman weighing 53 kilogrammes, 3 grammes daily for ten days for the older children and the elderly woman, and 1·5 grammes for the child of eight years. There was usually a febrile reaction, in four cases there was a complete clinical cure, but in one of these there was a complicating bacterial biliary infection which was eventually cured by intravenous urotropin after sulphonamides, penicillin and streptomycin had apparently failed. The fifth patient, a woman of 66, died of azotaemia after treatment ; she had previously damaged kidneys.

The authors believe that the albuminuria was due to the infection and that it was increased by the antimony preparation killing the parasites and causing an increase of circulatory toxin, rather than by the direct effects of the drug itself, since it never produces this effect in the treatment of leishmaniasis.

The eosinophilia and the lung symptoms suggested Löffler's syndrome which has been shown to occur in distomiasis as well as in ascariasis.

L. E. Napier

HERNBERG, C. A. **Roentgenological Visualization of the Fish Tapeworm, *Diphyllobothrium latum*, in the Intestine of Man. A Preliminary Report.** *Acta Med. Scandinavica.* 1949, Aug. 15, v. 135. No. 2, 138–41, 3 figs.

" Eight tapeworm carriers (Diphyllobothrium latum) were roentgenologically examined after a barium contrast meal. In three cases parts of the worm could be visualized. In one case the roentgen picture showed the worm in the colon, and in two cases in the ileum. In all the eight cases the peristalsis of the intestine was increased."

ARCHIVOS SEC. SALUD PUBLICA DE LA NACIÓN. Buenos Aires. 1948, May, v. 3, No. 18, 66–77. Realizose en Azul el Segundo Congreso Internacional de Hidatidosis. [**Second International Congress on Hydatid Disease, held at Azul, Buenos Aires.**]

This article consists of notes of an international Congress held in May, 1948, at Azul in Buenos Aires, and devoted to the subject of hydatidosis. The account is itself an abstract and it is to be hoped that the Proceedings will be published in full in due course.

The Congress was opened by Dr. BOCCALANDRO, the Minister of Health, and Dr. José M. JORGE was appointed President. At the first plenary session, Dr. Pérez FONTANA read a paper on the Pathology of Hydatids of the Lung and Dr. ITURRIOZ one on Radiological Interpretation. The second main feature for discussion was the Surgery of Pulmonary Hydatid introduced by Dr. Iván Goñi MORENO, and the difference in the treatment of small and medium-sized uncomplicated cysts and the large, infected or haemorrhagic cysts for which resection is the only cure. Drs. MANFREDI and CASIVAGHI spoke of Calcagno's biological method of injecting progressive doses of hydatid antigen which, they maintained, brought about disappearance of the symptoms and often actual cure.

The section of prophylaxis was in charge of Professor ROSENBUSCH, who showed that sheep were the most infested animals suffering from pulmonary

hydatid and that dogs are the most important vectors. Human beings are infested by the digestive route only. He refers to an instance where a dog ate infected meat and itself in time conveyed the disease to all the members of the family with which it lived.

At the second plenary session the main theme was the Biological Treatment of Hydatidosis, introduced by Dr. Imaz APPATHIE who also read a paper, conjointly with Dr. LORENZ, on the Serodiagnosis of Hydatidosis. Several of the delegates spoke on Calcagnos biological treatment, in which there is used as antigen the hydatid fluid and triturated membrane in a series of progressive injections.

Resolutions were passed urging the authorities in the different States to class hydatidosis as an industrial disease. Matters proposed as major subjects for the next Congress were the biological treatment of the infestation and the surgery of *Echinococcus* infections of bones. *H. Harold Scott*

BONNECARRERE, E. A. & ARDAO, R. La nefrectomia parcial en la hidatidosis renal. [**Partial Nephrectomy and Renal Hydatidosis.**] *Arch. Uruguayos de Med., Cirug. y Especialidades.* 1949, Feb., v. 34, No. 2, 221–30, 12 figs.

BATTELLI, C. Ricerche parassitologiche sui muridi di Asmara. [**Parasites of Rodents in Asmara.**] *Riv. di Parassit.* Rome. 1949, Sept., v. 10, No. 3, 159–65. [16 refs.] English summary (4 lines).

Examining certain rodents in Asmara the author found the following parasites: *Entamoeba muris* (once), *Giardia muris*, *Diplocercomonas* (once), *Trypanosoma lewisi*, *Eimeria falciformis*, *Eimeria nieschulzi* (once), *Bartonella muris*, *Anaplasma marginale*, *Hepatozoon muris*, *Sarcocystis muris*, *Cysticercus cellulosae* (once), *C. fasciolaris*, *Hymenolepis diminuta*, *H. nana* var. *fraterna* (once) and *Diphyllobothrium* larvae. Of these the only ones which might infect man are *Cysticercus cellulosae*, *Hymenolepis diminuta*, *H. nana* and the *Diphyllobothrium*. The value of the proportional findings is much reduced when we note that of the five species of rodent examined the total amounted only to 40, namely *R. rattus* 20, *Mus decumanus* and the white rat 6 each, and the house mouse and field mouse (*Arvicola*) 4 each. *H. Harold Scott*

See also p. 1105, FERREIRA, PINTO & DE ALMEIDA, **Alguns dados sobre a biologia do *Anopheles gambiae* da cidade de Bissau e arredores (Guiné Portuguesa), em relação com a transmissão da malária e filaríase linfática.**

ANN. NEW YORK ACAD. SCI. 1948, May 25, v. 50, Art. 2, 19–170, 22 figs. [Numerous refs.] **The Chemotherapy of Filariasis** [ASHBURN, L. L. & others].

This symposium on the Chemotherapy of Filariasis was the result of a Conference held by the School of Biology of the New York Academy of Sciences on October 17th and 18th, 1947. Thirty-eight authors, many of them well known in this field of research, contributed 15 papers, covering all aspects of the subject, which will be welcomed by fellow-workers all over the world. The introductory paper by COGGESHALL describes the filarial organisms infecting man as belonging to the genera *Wuchereria*, *Onchocerca*, *Mansonella*, *Acanthocheilonema* and *Loa* and in addition the closely related filarial worm *Dracunculus medinensis*. The filarial parasites which occur in lower animals have played a large part in the experimental studies of this infection. The author briefly discusses the history of *W. bancrofti*, including its introduction to the United States. During the course of filarial infections, which tend to be chronic, no

marked immunity is produced and the possibilities of vaccine therapy appear to be limited. The major effort for protection has, in the past, been devoted to the control of mosquito vectors. In spite of the high incidence of infection, the low mortality rate has made all but Public Health Authorities relatively indifferent, and the view is expressed that new and effective chemotherapeutic remedies should prove of the greatest service in eliminating the infection.

In describing general experimental methods of studying filarial infections HEWITT (who collaborates in two later papers) points out the importance attained by the cotton rat infected with the filarial worm *Litomosoides carinii* in these investigations during recent years. Naturally infected animals were at first used but difficulties were encountered with this type of infection. Controlled infections in rats of known duration are now generally employed in these chemotherapeutic studies. To a lesser extent dogs infected with *Dirofilaria immitis* have also been used in combination with *in vitro* techniques. Some correlation exists in the results obtained from studies in man, dog and cotton rat in spite of the different parasitic genera involved. The policy of using the cotton rat has paid handsome dividends by providing fresh leads for the synthesis of new chemotherapeutic agents.

From their own experimental data and studies of the literature OTTO and MAREN conclude that trivalent arsenicals are of value in the treatment of human and canine filariasis and that in this class of compound, the further study of phenylarsenoxides is warranted by results.

BROWN outlines his investigations on the value of anthiomaline in filariasis. Dogs infected with *D. immitis* were first used in conjunction with *in vitro* techniques. Development of polarographic and colorimetric methods for the estimation of Sb made it possible to investigate the distribution and excretion of this substance in the body. In some patients intramuscular injection of anthiomaline produces a rapid and persistent diminution in the microfilariae of *W. bancrofti*. In dogs similar results were obtained but the action on adult worms was not accurately determined.

As pointed out by CULBERTSON, reliable data on the results of chemotherapeutic treatment of *W. bancrofti* infections has only recently become available. This author was the first to use cotton rats, naturally infected with *L. carinii*, as hosts for the *in vivo* evaluation of new filaricides. The chief effect was found to be against the adult worms. Human experiments were carried out on volunteers in Porto Rico in which infections with *W. bancrofti* were treated with tri- and pentavalent antimonials, as well as with melarsen oxide. The author believes that the hazards of some drug treatments are greater than those of the infection and that safer drugs, which preferably can be administered by mouth, are urgently required. In his experience Neostibosan was the best tolerated and most effective of the antimonials. There was no correlation between antimony levels in blood and antifilarial counts. He believes that it is possible to eliminate infections of *W. bancrofti* by intensive treatment with arsenicals and antimonials.

BARTTER *et al.* describe their experiences in Guatemala on treating 25 volunteers with onchocerciasis by stibophen (Fouadin) and tartar emetic. Biopsies were made of skin nodules by snipping, followed by examination in saline for microfilariae. Observations were made for the presence of adult worms and were continued for five to seven months after treatment ended. The distribution of Sb in tissues was followed after administration of tartar emetic containing the radioactive isotope of the metal. Microfilariae were not killed by the drugs and the damage to adult worms was probably slight.

The toxic effects of Sb given parenterally have long been recognized and their nature, sequence and frequency in 75 patients after intensive treatment with seven different antimonials are described by ROSE. In each case toxic

reactions of varying severity were encountered. It was noted particularly in the case of neostibosan and to a lesser degree with neostam that a tolerance developed to the drug. In contrast to these results with pentavalent compounds, the opposite effect was produced by the trivalent substances Fouadin, anthiomaline and tartar emetic. In some cases urea stibamine produced severe reactions but stibanose was given without untoward effects. The author believes that melarsen oxide is a dangerous drug even in moderate doses.

Cyanine dyes have been found to show remarkable activity in filarial infections and their chemistry is briefly discussed by BROOKER. The chemotherapeutic activity of these substances and related compounds is then discussed by WRIGHT *et al.* The special cages and holders used to facilitate treatment of the cotton rats host are described. In the reviewer's laboratory cotton rats, used for experimental studies on kala azar, are handled with great ease by a skilled technician without any special apparatus. Animals were treated every eight hours and received 18 doses of drug. Variations in activity of these substances with alteration in constitution are outlined. The essential structure for activity of cyanines appeared to be a resonating system consisting of tertiary and quaternary nitrogen atoms separated by a carbon chain with an uneven number of carbon atoms and conjugated double bonds.

In a most interesting paper BUEDING describes the effect of cyanine dyes on the metabolism of *L. carinii*. Both *in vitro* and *in vivo* these substances, in extremely low concentration, inhibit the oxidative metabolism of the parasite. Their curative effect appears to be exerted by this means. The action of cyanines is, moreover, highly specific since concentrations 500 to 1,000 times greater have no effect on the respiration of animal tissues or the activity of various cytochromes. The metabolism of *L. carinii* shows many differences from that of other parasites and would appear to be worthy of closer study.

In a short paper the antifilarial action, toxicology and clinical trials of certain cyanine dyes in human infections are described by PETERS. The cyanines had been selected after tests against *L. carinii* infections of cotton rats along with *in vitro* studies of the metabolism of the adult worm. Although active against cotton rat infections the results in man were disappointing.

KUSHNER *et al.* discuss the chemistry of piperazine compounds in the chemotherapy of filariasis. They were interested in obtaining a non-metallic filaricide which could be given orally. As a result of screening experiments in cotton rats the activity of piperazines was discovered. The production of hetrazan (1-diethylcarbamyl-4-methylpiperazine) is a sufficient tribute to the value of these researches. HEWITT *et al.* present data on the filaricidal properties of 126 of these compounds including Hetrazan, of which about 20 per cent. were active against microfilariae in cotton rats infected with *L. carinii*. They caused an immediate reduction in the numbers of circulating microfilariae, and the adult worms were affected to some extent in the cotton rat and dog hosts. In contrast Sb compounds and cyanine dyes affect adult worms without reducing the microfilarial count. Oral dosage was as effective as parenteral. Later, compounds of this type were found to be effective against *W. bancrofti*. Frequent dosage was necessary and toxicity was negligible. The low toxicity of hetrazan was confirmed by HARNED and co-workers who also found that few side reactions resulted from its use. The dosages tolerated by various laboratory animals are recorded. Excretion was found to be rapid by the kidney but the form in which the drug was eliminated has not been determined.

In the final paper of this symposium SANTIAGO-STEVENSON *et al.* describe the results obtained by treating 26 Porto Rican patients harbouring the microfilariae of *W. bancrofti* with Hetrazan. All were in-patients and the drug was administered orally at intervals of eight hours in doses of 0·5 to 2 mgm. per kilo of body weight over a period of three to 21 days. Although a few

untoward symptoms occurred they were not of a sufficiently serious character to cause discontinuation of treatment. There was a rapid reduction in the microfilarial count. At the end of 160 days after treatment, ten of 26 cases were still negative, and in a large percentage of the remainder numbers of microfilariae were reduced. For best results a dose of 2 mgm. per kilo three times daily for two to three weeks is suggested. There was some evidence that adult worms had also been affected. *J. D. Fulton*

Otto, G. F. & Maren, T. H. **Studies on the Chemotherapy of Filariasis. Parts I–IV.** *Amer. J. Hyg.* 1949, July, v. 50, No. 1, 92–141, 3 figs. [49 refs.]

Part I of this series gives a general introduction to the search for effective filaricidal drugs.

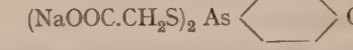
Part 2 describes the testing of compounds *in vitro* on the microfilariae of *Dirofilaria immitis* from the dog. One part of infected blood was mixed with four parts of 0·5 per cent. sodium citrate and five parts of Locke-Ringer's solution containing the drug in appropriate concentrations. The final fluid contained over 1,000 microfilariae per ml. and it was incubated at 30°C. The survival of the microfilariae was studied by removing small samples and examining under the microscope. Studies were also carried out on the adult worms of *Litomosoides carinii* obtained from cotton rats and incubated at 30°C. in Simm's solution plus 5 per cent. horse serum.

A list is given of 75 non-metallic organic compounds tested on microfilariae. Most of these were inactive, but some activity was observed in dodecylguanidine,

9-chloro-9-(p.dimethyl aminophenyl) 10-methylacridine,
4-(p.dibutyl aminobenzyl) antipyrine, and
4,4′-bis antipyrine

and another acridine derivative in concentrations of 1 in 10,000.

Forty-seven metal-organic compounds were tested. Many of the phenyl-arsenoxide derivations were highly active (killing microfilariae in concentrations of 1 part of As in a million in 22 hours). Activity was also observed in other trivalent arsenicals and antimonials but not in mercuric chloride or in pentavalent arsenicals or antimonials. The microfilariae of *L. carinii* were less sensitive *in vitro* than those of *D. immitis*. The adult worms of *Litomosoides* were also more resistant to the chemicals than the microfilariae of *D. immitis* but the results were roughly parallel. Some of the more active phenyl-arsenoxide derivations killed the adult worms in concentrations of one part As in a million in 22 hours. The activity of the various phenyl arsenoxide derivatives upon microfilariae *in vitro* was compared with their toxicity for mice. The most favourable ratio was given by p-arseno-benzamide. This compound is relatively insoluble but a soluble derivative, the dithioglycollate was prepared which was equally active and no more toxic. This compound has been developed further under the name of "arsenamide".



The activity of this substance was not impaired by the presence of erythrocytes.

Part 3 describes *in vivo* studies on the filaria of cotton rats. Wild animals with spontaneous infections were used. Drugs were injected intraperitoneally twice daily for five days of the week, for 45 days. The animals were then killed and the adult worms were examined for motility. Of 33 control untreated rats, 27 contained a total of over 1,200 worms, all alive, and five rats contained 194 living worms plus 49 dead worms. In one rat as many as half the worms were dead. The microfilarial counts were very variable during the experimental period but they tended to increase.

Among the compounds tested there were four trivalent antimonial compounds; these were without any conspicuous antifilarial activity against the adult worms even in high doses (0·3 mgm. Sb. per kgm. per day). Among the trivalent arsenical compounds mapharsen, and the trivalent analogue of carbarsone were also relatively inactive (only two rats treated). Six of the other phenyl arsenoxide derivatives killed all the female worms and many of the males, *viz.* the para derivatives with

$-(CH_2)_3COOH$
$-CO.NH_2$
$-CONH\ (CH_2)_2OH$
$-SO_2\ NH_2$

and arsenamide and melarsen oxide.

It is concluded that the specific filaricidal activity of the phenyl arsenoxides is particularly associated with para-amide substitution. [All these results were obtained with only 2–3 rats per compound, so they are suggestive rather than conclusive.]

In animals treated with these arsenical compounds for 45 days, the microfilarial count often fell considerably (>50 per cent.) but did not become negative. In two rats which were treated with arsenamide and then followed up for 4–6 months, the microfilarial count gradually diminished, becoming negative after about five months. [This suggests that the main filaricidal activity is on the adult worms, and that the microfilariae disappear gradually from other reasons as their source of replacement has been cut off.]

Of five pentavalent arsenicals examined, two, *viz.* p-carbamyl phenyl arsenic acid and melarsen, were active, and so were two pentavalent antimonial compounds, *viz.* stibanose and neostibosan. But in view of the promising results already obtained with arsenamide, these were not investigated further. Antimony compounds seem to kill the female worms more readily than male ones. If this were the same in man with *W. bancrofti*, a patient might *appear* to be cured because the microfilariae disappeared from the blood, but live male worms might persist and continue to stimulate pathological processes.

Part 4 describes therapeutic trials upon *Dirofilaria immitis* in dogs. Arsenicals were given intravenously and antimonials intravenously and intramuscularly. P-arseno-benzamide was given to three dogs in daily doses of 0·45 mgm. As per kgm. for 37–43 days. In two, all the adult worms were killed and in the third (which survived for a year) only one female worm escaped. With arsenamide, doses as low as 0·23 mgm. As per kgm. per day for 11–15 days killed all the adult females, but even much higher doses had no immediate effect on the microfilarial count. [For further details, see Otto and Maren, this *Bulletin*, 1947, v. 44, 1083.]

Among the trivalent antimonial compounds tested, sodium antimony thioglycollate killed all the microfilariae but not the adult worms, antimony thioglycollamide gave a similar result (one dog) and stibanose (12 mgm. Sb per kgm. per day) was ineffective. There was no evidence that the antimonials had produced sterility in the female worms, except in dogs treated with antimony thioglycollamide. In the dogs in which the microfilariae were killed by antimonials, intense leucocytosis occurred.

[These papers describe a large scale careful investigation extending over several years, and they should be consulted in the original by those interested in this subject.] *F. Hawking*

Shookhoff, H. B. & Dwork, K. G. **Treatment of *Loa loa* Infections with Hetrazan.** *Amer. J. Trop. Med.* 1949, July, v. 29, No. 4, 589–93.

Five cases of loiasis were treated with Hetrazan in doses of 100 mgm. 1·3–1·7 mgm. per kgm.) thrice daily for seven to ten days. None showed

Mf. loa in the blood before (or after) treatment. They had had Calabar swellings and worms in the eye at some previous period during courses of 1–11 years. In all but one patient, there was an exacerbation of symptoms when treatment was started. In one case, there was a severe reaction (pyrexia, tachycardia, precordial oppression, tightness of the chest, and severe urticaria and euphoria); all but the last two symptoms subsided by the second day, and the patient then saw many areas of redness under the skin, which may have been reaction round the worms; by the end of the week he was feeling well and later he took a second course of Hetrazan; in another patient (whose main symptoms had been pruritus) the pruritus became very severe for the first 24 hours. Otherwise there were no toxic reactions. All the patients were relieved of their symptoms (especially Calabar swellings) by the first course, but two relapsed and required a second course.

It is considered that Hetrazan has great therapeutic value for loiasis, but caution is required at the beginning of therapy to minimize allergic reactions.

F. Hawking

MENDHEIM, H. & SCHEID, G. Erfahrungen mit Phenothiazin in der Therapie der Oxyuriasis. [**Phenothiazine in the Treatment of Enterobiasis.**] *Deut. med. Woch.* 1949, Aug. 26, v. 74, Nos. 33/34, 1022–3. [22 refs.]

In Germany after the war, say the authors, infestation by *Enterobius vermicularis* increased enormously. Hexylresorcinol was unobtainable and gentian violet hard to get [*kurzem im Handel*, equivalent to the all-too-common English euphemism "in short supply"]. They, therefore, tried Reconox, a locally made preparation of phenothiazine, a drug originally introduced as a urinary disinfectant and later used by veterinarians for helminthic infestation by trichostrongylids, strongylids and ascarids. Impure preparations or large doses caused nausea, abdominal pain and diarrhoea, so the authors use a pure preparation and prefer small doses and two or more courses to a single course of larger dosage. For children of 10 years upwards they give a tablet containing 0·2 gm. thrice daily for 10 days, *i.e.*, 6 gm. altogether; for younger children half this. They have had no patients under three years of age. The tablets are given before food, with a little water. They are tasteless and are therefore taken readily. Of 200 patients so treated, 50 of them children, 159 (79 per cent.) were cured (that is, no worms were seen in a two-months' follow-up) by one course, and 13 more (6·5 per cent.) by a second course. [See this *Bulletin*, 1949, v. 46, 961.] For an account of a much bigger series treated with comparable total doses, and for a discussion of possible toxic effects and the precaution to be taken, see KUITUNEN-EKBAUM, this *Bulletin*, 1946, v. 43, 940.]

H. Harold Scott

DEFICIENCY DISEASES

CAVALADE, C. N. G. Le problème de l'alimentation dans les colonies françaises. [**Dietary Problems and Nutrition in the French Colonies.**] *Arch. Méd. Sociale.* Paris. 1945, Nov. 1, v. 1, No. 8, 521–47.

PIERAERTS, G. Syndrome de dépigmentation-oedème (Kwashiorkor) au Kasaï. Essais thérapeutiques. I. [**The Syndrome of Depigmentation-oedema (Kwashiorkor) at Kasai. Therapeutic Trials. I.**] *Ann. Soc. Belge de Méd. Trop.* 1949, June 30, v. 29, No. 2, 231–46. [15 refs.]

The author describes a series of cases of deficiency diseases seen in the Belgian Congo, in which the clinical features closely resembled the syndrome now generally known as kwashiorkor.

Eleven patients (seven serious) were treated with a preparation of stomach fundus (Ventriculin, Parke, Davis), receiving 10 gm. daily for six consecutive days. No improvement was noted in any case.

Sixteen patients (eight serious) were treated with folic acid. They received twelve to twenty doses of 10 mgm. spread over two to four weeks. In most cases no improvement was noted ; in some there was definite improvement but the author could not satisfy himself that spontaneous remissions might not be responsible.

These careful trials were carried out in the homes of the patients. No attempt was made to control the diet or to eradicate intercurrent infection. The trials show clearly that neither ventriculin nor folic acid is likely to be of any use in a large-scale field campaign against the kwashiorkor syndrome, but they do not preclude the possibility that they might be useful adjuvants to a full therapeutic régime in hospital. *R. Passmore*

Rinehart, J. F. & Greenberg, L. D. **Effect of Experimental Thiamine Deficiency on the Heart of the Rhesus Monkey.** *Arch. Pathology.* 1949, July, v. 48, No. 1, 89–95, 2 figs. [16 refs.]

Five of seven rhesus monkeys subjected to repeated periods of thiamine deficiency showed dilatation of the right ventricle and auricle at autopsy. Four of them showed microscopical changes in the heart muscle. These changes were of two kinds : focal necroses of varying extent and mainly subendocardial, and small areas of cytoplasmic " hydropic degeneration " and irregular nuclear hypertrophy in the fibres of the conduction system. The latter change is considered specific to thiamine deficiency, since it has not been found in controls or in other animals subjected to equally prolonged periods of inanition resulting from deficiency of other substances. *H. E. Harding*

Rinehart, J. F., Friedman, M. & Greenberg, L. D. **Effect of Experimental Thiamine Deficiency on the Nervous System of the Rhesus Monkey.** *Arch. Pathology.* 1949, Aug., v. 48, No. 2, 129–39, 9 figs. [25 refs.]

During the course of repeated deprivations of thiamine, seven monkeys showed in varying degree profound weakness and ataxia : one or more of them also showed signs of cranial nerve weakness or hyperirritability, but no clinical evidence of peripheral neuritis was observed. Examination of the central nervous system at postmortem showed changes which corresponded in a general way to those of Wernicke's encephalopathy, but differed from the latter in several respects. Bilateral symmetrical areas of degeneration confined to the grey matter were found most commonly in the corpus striatum, and were seen also in the globus pallidus, substantia nigra, mamillary bodies, corpora quadrigemina, cerebellar cortex, and in the nuclei of III, VI, VIII and X cranial nerves. The areas of degeneration resembled ischaemic infarcts, but no physical obstruction to the blood supply could be demonstrated : capillary proliferation was found only on the periphery of the older lesions, and was taken to represent an attempt at repair. No pathological changes were found in the peripheral nerves nor in the spinal cord. *H. E. Harding*

HAEMATOLOGY

Spies, T. D., Stone, R. E., Garcia Lopez, G., Milanes, F., Lopez Toca, R. & Aramburu, T. **Vitamin B_{12} by Mouth in Pernicious and Nutritional Macrocytic Anaemia and Sprue.** *Lancet.* 1949, Sept. 10, 454–6, 1 chart.

Three chemical substances are known to promote blood regeneration in pernicious anaemia ; these are folic acid (pteroylglutamic acid), thymine

(5-methyluracil), and vitamin B_{12}. While the detailed chemical structure of the first two has been determined, that of the third so far has not ; though the first two compounds do not protect the nervous system in cases of pernicious anaemia, vitamin B_{12} does do so. Thymine must be given in such large doses (15 gm. daily) that its therapeutic use is impracticable, but folic acid has proved therapeutically effective in nutritional macrocytic anaemia and in sprue. Vitamin B_{12}, which has been isolated from liver extract and from streptomycin residues, is the most potent anti-anaemia substance so far known ; it corrects the anaemias of pernicious anaemia, of nutritional macrocytic anaemia and of sprue.

In the present paper are recorded details of the haemopoietic response of three of the 16 cases of pernicious anaemia, two of the 17 cases of nutritional macrocytic anaemia, three of the 14 cases of sprue, and one of the two cases of non-tropical sprue treated with vitamin B_{12}. All the patients were adults (the youngest of the nine mentioned being 56 years) free from other infections or severe complications ; all before treatment had a macrocytic hyperchromic anaemia, with a red cell count under three million per cmm. and a colour index over one ; in all there was megaloblastic arrest in the sternal marrow. Every patient was on a diet free from meat or meat products during the period of observation and treatment. In some cases treatment was repeated on one to three occasions with variations in dosage. In the actual cases recorded the dosage of vitamin B_{12} ranged from a single oral dose of from 30 microgm. to 1,500 microgm. ; daily oral dosage for 10 days with 450 microgm. ; single intramuscular doses of from 25 to 45 microgm. ; and daily intramuscular doses of 30 microgm. for three days.

The authors conclude from observation of their series of cases that the minimum, maximum, and optimum doses of vitamin B_{12} vary from one patient to another, there is no generally-applicable standard dosage ; the compound is more effective when given parenterally than orally. Though some patients with megaloblastic marrow arrest do not respond to liver extract, to folic acid, or to vitamin B_{12}, most do so slowly when vitamin B_{12} is given orally in doses 30 to 60 times as great as those needed parenterally ; treatment by the parenteral route ensures more certain and rapid improvement. Though no allergy or sensitivity to injections of vitamin B_{12} was observed, it is probable this will eventually be encountered and in such cases oral treatment may be necessary.

[This interesting and important paper is already a summary ; it does not lend itself to further condensation and should be consulted in the original. See also this *Bulletin*, 1949, v. 46, 863.] *A. R. D. Adams*

SINGER, K. & ROBIN, S. **Rapid Test for the Demonstration of Sickle Cells and its Clinical Significance.** *J. Amer. Med. Ass.* 1948, Apr. 17, v. 136, No. 16, 1021–5, 2 figs. [Refs. in footnotes.]

The authors describe a simple and rapid test for demonstrating the sickling phenomenon in patients with sickle-cell anaemia or the sickling trait.

Sickling can only occur when haemoglobin is present in the reduced state. In this test advantage is taken of the respiratory activity of bacteria and the rapidity with which sickling occurs is independent of the oxygen consumption of the blood cells present, namely the reticulocytes and white cells. It, therefore, occurs rapidly in all conditions and as rapidly in healthy patients with the trait as in those with anaemia.

The technique is as follows :—

" One drop of a turbid broth culture of *Bacillus subtilis* is mixed with 1 drop of blood, the preparation sealed with paraffin and placed in the incubator at 37°C. Usually after five minutes a positive reaction shows the presence of

characteristic oat cells or fully developed sickle cells. If after fifteen minutes no sickling is demonstrable the result can safely be reported as negative."

Repeated washing of the red cells with saline reduces the rate of the reaction but does not abolish the sickling phenomenon. The rate is restored if serum or bovine albumin is added.

The test should be performed as a routine for all negro patients, in view of the numerous syndromes that sickle-cell disease can simulate. There does not appear, however, to be any objection to using as blood donors persons with the trait, since trait cells appear to survive normally when injected into a normal person. [See also WILLIAMS and MACKEY, this *Bulletin*, 1949, v. 46, 774.]

L. E. Napier

GRIFFITHS, S. B. & LIPSCHITZ, R. **Haemophilia in a South African Bantu. Report of a Case.** *South African Med. J.* 1949, Aug. 27, v. 23, No. 35, 720–21, 1 fig.

" This case would thus appear to be the first to be reported in a South African Bantu and the second in an African Negro."

VENOMS AND ANTIVENENES

SHULOV, A. *Latrodectus revivensis* **sp. nov. from Palestine.** Reprinted from *Ecology*. 1948, Apr., v. 29, No. 2, 209–15, 12 figs. [18 refs.]

A fully illustrated description of the new spider (*Latrodectus revivensis*) is followed by a table of characters by which it may be distinguished from the two species already known to occur in Palestine (*L. XIII-guttatus* and *L. pallidus*). A brief account is then given of some aspects of the life history of the new species and this includes a list of the prey found in thirty-one webs, most of which were beetles but there were other insects and some scorpions and solfugids. Data obtained from a few experiments on the effect of the bite of *L. revivensis* on voles (*Microtus guentheri*) suggest that the venom of this spider is about as potent as that of *L. PIII-guttatus* which killed voles in seven hours.

H. S. Leeson

DONOSO BARROS, R. Consideraciones sobre aracnoidismo cutaneo en Chile. [**Cutaneous Spider-Bites in Chile.**] *Arch. Uruguayos de Med., Cirug. y Especialidades*. 1948, Nov.–Dec., v. 33, Nos. 5/6, 184–206, 3 figs. [58 refs.] English summary.

[The title of this article is not altogether well chosen, for all spider-bites are cutaneous and all are associated in greater or lesser degree with systemic and not purely cutaneous symptoms.] The author divides arachnoidism into two clinical forms: the nervous and neurotoxic, due, in Chile, invariably to *Latrodectus mactans*, and the cutaneous which is the subject of this communication.

Three species of spiders causing the latter are found in the country: *Loxosceles laeta*, which is widely distributed from Tarapacá near the border with Peru to the north down to Talca in the south [which lies almost on the same latitude as Buenos Aires]; *Scytodes globula* and *Lycosa murina*, the former producing slight, the latter severe necrotic, lesions of the skin. These spiders propagate in the fields and attack agricultural workers; hence, among 37 patients, males were more frequently bitten than were females, 26 and 11 respectively. They

hide also in crevices in walls of dwellings and behind pictures, in clothes and even in beds ; in fact, 18 of the 37 were bitten during sleep, and 17 were bitten on the neck or arms.

The symptoms caused by the bite of *Loxosceles laeta* or *Lycosa murina* may be divided into three stages : 1. *Early period*, the first 24 hours. A pricking sensation like that of a needle, followed by burning pain and local redness (both these symptoms vary considerably from patient to patient), then a " white oedema " and pruritus. These may be accompanied by restlessness, rarely general pains (in two patients only), vomiting, shivering, headache, jaundice, all uncommon and seen in two or three patients only. 2. *Middle period.* Oedema over an area of 20–25 cm. round the site bitten and in 3–4 days usually—but may be earlier—a local necrosis up to 3–4 cm. in diameter with a corona of vesicles and lasting for 2–3 weeks. There may be constitutional symptoms—fever to 38°C. (in one who died it reached 39·5°), with rapid pulse and, rarely, dyspnoea ; the blood shows a fall in erythrocytes to about 3,000,000 and in haemoglobin to 55 per cent. ; leucocytosis is marked, the average is 14,000–15,000, but in one patient it was 24,000 ; eosinophiles may comprise 20 per cent. (in one 30 per cent.). 3. *Clearing-up period.* The scab separates in three weeks or so, leaving an ulcer 10–15 cm. in diameter which takes 1–2 months to heal. The prognosis is grave, especially if signs of jaundice and haemolysis are present. Treatment is purely symptomatic, no specific serum being yet available. The post-mortem findings in a fatal case are detailed. Locally, on the forearm there was a dark, haemorrhagic necrotic mass involving the skin and subcutaneous tissues ; fatty myocardium and blood-stained fluid in the pericardium, kidneys congested, swelling of the tubular epithelium which was in parts necrotic ; granular casts, vessels in the interstitial tissue contained haemolysed blood ; liver dark red with yellow zones and marked granulo-fatty degeneration ; spleen dark and friable ; blood-stained urine in the bladder.

Scytodes globula causes only mild symptoms, local oedema, no necrosis, a temperature rise to 38°C., accompanied by a morbilliform rash mostly on the face, chest and arms, fading in 48 hours. Other mild forms were characterized by a fleeting oedema whlch disappeared in a few hours, or by small vesicles which cleared spontaneously in three to four days.

H. Harold Scott

DERMATOLOGY AND FUNGUS DISEASES

Weiss, P. Estudio comparado del mal del Pinto o enfermedad de Leon Blanco con las otras treponemiasis, pian, sifilis. [**Comparative Study of the Treponematoses, Mal del Pinto, Yaws and Syphilis.**] *Rev. Argentina Dermatosifilologia.* 1948, Jan.–June, v. 32, Nos. 1/2, 23–9, 7 figs. [16 refs.]

[An interesting account, but touching little more than the fringe of the subject.] The author considers the diseases mentioned in the title and also bejel, pointing out that the causative organisms are morphologically indistinguishable, the clinical symptoms many of them similar, serological reactions the same, but that there is no cross-immunity between them. Differences are that pinta and yaws are not hereditary and are not transmitted venereally, initial lesions are on exposed skin surfaces, the diseases are more common in small rural communities, among the poor and those working in the fields and they are possibly transmitted by an insect vector. Pinta with special affinity for the skin exhibits also a vaso-tropism, perithelial, comparable with syphilis. Pinta is the most benign of the treponematoses and most amenable

to treatment, though some lesions may be more severe with endothelial proliferation and small abscesses, but not ulceration, though the epithelial reaction may lead to keratosis and pitting. In yaws and syphilis, tertiary lesions result from an allergic state in the production of inflammatory nodules, giant-cells, epithelioid proliferation and caseation.

According to the author, the "ides"—palmar and plantar keratosis, juxta-articular swellings—constitute the clinical common denominator of the treponematoses, and pintids correspond to lichen, psoriasis and pityriasis, and flat papillomata seen sometimes in syphilis and yaws. The hypothesis is put forward that syphilis untreated for several generations, by change in the body-organism complex, evolves into the more benign form, pinta. Much has been written on the common origin of yaws and syphilis, and the same may hold good of syphilis and pinta. But the absence of cross-immunity confirms the actual independence of the diseases in question. León Blanco has inoculated advanced syphilitics with *T. carateum*, and patients with pinta may develop a syphilitic chancre ; Kuczinsky in Huayabamba saw a pinta patient with fresh yaws lesions, and those having yaws have been seen who later developed pinta. There remains the possibility that mal del pinto has changed its character since pre-Columban days when, as seen in tombs of the period, it produced bony lesions like those of syphilis and even yaws.

The author concludes with an observation which may be translated : "Disregarding the changes which pinta may have undergone in the course of time and through the influx of new peoples, the accounts of Indian historians, folk-lore, popular medicine, ceramic exhibits and pre-Columban osteitis indicate that the three treponematoses have an American origin." *H. Harold Scott*

Furcolow, M. L. & Ruhe, J. S. **Histoplasmin Sensitivity among Cattle.** *Amer. J. Pub. Health.* 1949, June, v. 39, No. 6, 719–21, 2 figs.

In making a survey of histoplasmosis among small animals, especially rodents, the culture method is usually employed, but this involves much work and the destruction and examination of a great many animals in proportion to the very few found infected. For large animals, as for man, it is better to use the test of dermal sensitivity to histoplasmin ; at least as a preliminary to culture methods.

On a farm in Kansas on which a human reactor to histoplasmin (presumed to be infected) had been found, two out of 13 cattle similarly tested were also found to be reactors. This discovery prompted the institution of a large-scale test involving 1,874 cattle, of which 22 per cent. were beef animals and 78 per cent. dairy cattle. The test, on the cow, consisted of injecting into the caudal fold 0·1 ml. of histoplasmin in a dilution of 1 : 10 or 1 : 5 according to the potency of the sample (about 100 times the dose used on man). Readings were taken at the end of 72 hours and a positive result was a palpable, and usually visible, oedematous swelling at the site of injection. Parallel tuberculin tests were made and no cross reaction between the two tests was ever found. In Eastern Kansas there were 4·2 per cent. reactors to histoplasmin out of 1,319 cattle examined, in Central Kansas 1·5 per cent. out of 136 and in Western Kansas no reactors out of 419 tested. The geographical distribution of the bovine reactors in the State was therefore similar to that of the human reactors, described by Bunnell and Furcolow [*Pub. Health Rep.* Wash. 1948, v. 63, 1298]. Most of the cattle tested were under nine years old, and on comparing 432 cattle and 423 children, in a single county of Kansas, in age groups from one year upwards it was seen that the plotted curves for human and bovine reactors coincided up to the age of seven years ; after that there was

a slight fall in the percentage of bovine reactors, but a further slight rise in the curve for human reactors.

An observation for which an explanation was not found was the relatively low incidence of reactors (1·3 per cent.) in 150 cattle in two institutional herds on the outskirts of Topeka, compared with a rate of 7·1 per cent. reactors among 282 cattle on 21 outlying farms in the same district.

The authors conclude that both human and bovine infections are derived from a common source and that cattle do not constitute an animal reservoir of importance in human histoplasmosis.

[It should be noticed that the investigation related only to dermal sensitivity to histoplasmin, and the determination of active infection has, apparently, not yet been attempted.] *J. T. Duncan*

SMITH, C. E., SAITO, Margaret T., BEARD, R. R., ROSENBERGER, H. G. & WHITING, E. G. **Histoplasmin Sensitivity and Coccidioidal Infection. I. Occurrence of Cross-Reactions.** *Amer. J. Pub. Health.* 1949, June, v. 39, No. 6, 722–36, 4 figs. [45 refs.]

The coccidioidin skin-sensitivity test, when properly performed, is accepted as the basis of diagnosis in primary coccidioidomycosis. Nevertheless, cross-reactions may occur with extracts of other fungi, especially haplosporangin. In the course of a survey of reactors to histoplasmin, FURCOLOW and NELSON [personal communication], in the State of Ohio, found among child reactors to histoplasmin some who also reacted to coccidioidin. There is no known endemic focus of coccidioidomycosis in Ohio and infection by *Haplosporangium parvum* may be excluded, which leaves the probability that cross-reactions with coccidioidin had occurred in children dominantly sensitive to histoplasmin.

In the routine performance of the coccidioidin skin test on soldiers arriving for duty in areas where coccidioidomycosis exists, mild or " equivocal " reactions were sometimes found in men who, apparently, had never been exposed to coccidioidal infection. An analysis of these cases showed that the majority came from parts of the east-central area of the United States where reactors to histoplasmin are very numerous. Among 3,376 healthy persons who gave negative or equivocal results to the coccidioidin test, 26 per cent. reacted dominantly to histoplasmin. Equivocal and occasionally positive reactions to coccidioidin in persons who had not been exposed to coccidioidal infection were found exclusively in the group of reactors to histoplasmin, and the frequency and intensity of the coccidioidin reaction was in measure with the sensitivity to histoplasmin.

In dominant histoplasmin reactors coccidioidin used at a strength of 1 : 10 may cause a strong non-specific reaction which may be misinterpreted, but mistakes can be avoided by the use of the test allergens in high dilution (1 : 1,000) In dominant coccidioidin reactors there was a much higher degree of cross-reaction. A group of 31 persons who were negative to both coccidioidin and histoplasmin subsequently developed coccidioidomycosis and became sensitive to both coccidioidin and histoplasmin. Dominant coccidioidin reactors were also sensitive to blastomycin, which is allergenically related to histoplasmin.

The persistence of histoplasmin sensitivity was exemplified in a group of six reactors who had lived outside the area of dominant histoplasmin sensitivity for 10 to 20 years. Finally, the geographical distribution of histoplasmin sensitivity as shown by the residential histories of the persons examined, confirmed the earlier observations of PALMER [*Bulletin of Hygiene*, 1946, v. 21, 665], PRIOR and ALLEN [*Bulletin of Hygiene*, 1948, v. 23, 250], and CHRISTIE and PETERSON [*J. Pediatrics*, 1946, v. 29, 417]. *J. T. Duncan*

NEGRONI, P. Estudios sobre el *Coccidioides immitis* Rixford y Gilchrist. I. Micelio vegetativo y fructificacion. [**Studies on *Coccidioides immitis* Rixford and Gilchrist. I. Vegetative Mycelium and Fructification.**] *Rev. Argentina Dermatosifilologia.* 1948, Jan.–June, v. 32, Nos. 1/2, 50–57, 7 figs. [12 refs.] English summary.

This is the first of a series of papers dealing with coccidioidomycosis in South America and in it the author gives a description of the microscopic morphology of *Coccidioides immitis* which does not differ from the numerous descriptions of the fungus from North American sources. Reference is made, however, to some characters of the vegetative mycelium usually not included in other descriptions. These are *mycelium en raquette*, appressoria, nodular organs and rudimentary sclerotia. The chlamydospores, the predominant reproductive form, are developed from a differentiated proconidium which may be carried on a pedicle. The tubular proconidium divides into cubical segments of which the apical one forms the first chlamydospore. Below this, alternate segments become spores in basipetal succession, the intervening, atrophic, sterile segments behaving as disjunctors.

Although the systematic position of *Coccidioides immitis* has not been established definitely, many mycologists place it in the Order of *Chytridiales* of the Class *Phycomycetes*; a rare example of a *Phycomycete* pathogenic for animals. The probable existence of sexual phenomena in the species, as suggested by CIFERRI and REDAELLI (*Boll. Sez. Ital. Internaz. Microbiol.* 1934, v. 6, 141), is accepted by Negroni. *J. T. Duncan*

NEGRONI, P. Estudios sobre el *Coccidioides immitis* Rixford y Gilchrist. II. Estudio micologico de las cepas autoctonas y revision del granuloma coccidioidico en la Argentina. [**Mycological Study of Indigenous Cultures and Revision of Coccidioidal Granuloma in Argentina.**] *Rev. Argentina Dermatosifilologia.* 1948, Jan.–June, v. 32, Nos. 1/2, 58–65, 4 figs. [21 refs.] English summary.

Although *Coccidioides immitis* in North America was studied in culture by OPHULS, as far back as the year 1900, DODGE (*Medical Mycology*, C. V. Mosby Co. St. Louis, 1935) and, more recently, KESSEL [this *Bulletin*, 1941, v. 38, 727] have indicated that the fungus in South America has not received similar attention.

Seven cases of coccidioidal granuloma have been identified in Argentina since 1892, when Posadas discovered the disease, and cultures from three of these cases were available for study. From the microscopic morphology of these cultures, described in Negroni's paper I [above], and the macroscopic characters of the colonies it was evident that the North and South American strains of *Coccidioides immitis* belong to one species.

Amongst the physiological tests applied was the auxanographic method of Beijerinck in which the capacity of an organism to utilize various selected substances as sources of necessary carbon and nitrogen is tested. For the carbon auxanogram Negroni used glucose, laevulose, mannose, galactose, rhamnose, maltose, lactose, saccharose, trehalose, raffinose, inulin, dextrin, arabinose, mannitol, glycerol, sorbitol, acetate of soda, citrate of soda, oxalate of soda and tartrate of soda, and found that the monosaccharides and acetate of soda were the most suitable. For the nitrogen auxanogram he used peptone, asparagin, ammonium sulphate, urea and ammonium chloride and found ammonium chloride to be the simplest source of nitrogen. *J. T. Duncan*

NEGRONI, P. Estudios sobre el *Coccidioides immitis*. III. Estudio micológico comparativo de las cepas Argentinas y Norteamericanas. [**Studies on *Coccidioides immitis*. III. Comparative Mycological Study of Argentine and North American Strains.**] *Rev. Argentina Dermatosifilologia*. 1948, July–Dec., v. 32, Nos. 3/4, 219–31, 4 figs. English summary.

Previous papers [above] dealt with the morphology of the vegetative and reproductive stages of *Coccidioides immitis*, drew attention to some hitherto unnoticed characters and presented a mycological study of three strains of the species isolated in South America. The present paper describes the comparative study of the three South American (Argentine) strains and eight from North America to determine if any morphological or physiological differences exist between the two groups.

In the physiological study, tests were made of the capacity of the vegetating fungi to utilize certain substances as sources of essential carbon and nitrogen ; as already described in paper II. The results of these tests, set out in tabular form, show that all of the substances examined could be utilized by at least some of the strains, often very freely, and where differences existed among the strains these were not related particularly to the North and South American groups. The most suitable sources of carbon for all strains were the monosaccharides and sodium acetate. Peptone, asparagine, histidine, urea, ammonium sulphate and potassium nitrate were tested as possible sources of nitrogen and all were found to be usable ; ammonium chloride being the simplest. The test did not reveal any difference between the North and South American groups. Other physiological properties, such as the production of haemolysin, the power to coagulate and digest milk and to liquefy coagulated serum varied with individual strains but the differences had no geographical relationship. The bacteriologically familiar hydrogen sulphide, indole, carbinol and nitrate reduction tests gave negative results with all strains, and the optimum temperature for vegetation was 30°C. for all except one strain (U.S.A. 694.).

The addition of a particular animal or vegetable fat—butter, lard, oleic acid or olive oil—to the culture medium failed to show any difference between the two groups of cultures in respect of the growth of aerial mycelium, production of spores or the depth of colour on the surface or reverse of the colony, but marked differences were found between individual strains.

Coccidioidin prepared from individual strains from North and South America and tested on guineapigs sensitized by infection with individual strains of the two groups, showed no difference in the reactions elicited.

Finally, a morphological study confirmed the results of the other tests which indicated that authentic strains of *Coccidioides immitis* from North and South America belong to one species. The single exception was strain U.S.A. No. 694, labelled " Blastomycosis, Chicago, Dr. Ota," which appears to be a species of *Scopulariopsis* and therefore should not have been included in the comparative study. *J. T. Duncan*

NEGRONI, P. & VIVOLI, D. Estudios sobre el *Coccidioides immitis*. IV. Virulencia de las cepas y su relación con los caracteres micologicos. [**Studies on *Coccidioides immitis*. IV. Virulence of the Strains and its relation with the Mycological Characters.**] *Rev. Argentina Dermatosifilologia*. 1948, July–Dec., v. 32, Nos. 3/4, 239–44, 1 fig. English summary (9 lines).

In an earlier report [see above] it was shown that, with a single possible exception (U.S.A. strain 694), 8 strains of *Coccidioides immitis* from the United States and 3 from Argentina, although presenting minor strain differences, morphologically belonged to the same species. The present report deals with a study of the virulence of these 11 strains and its possible relation to particular

morphological features. The cultures, grown in a synthetic liquid medium, were inoculated by the peritoneal route into 65 guineapigs. The 11 strains showed wide differences in pathogenicity and virulence as judged by the extent and duration of the disease and its ultimate result, but no relation was found between the pathological effects on the one hand and the morphological peculiarities of a strain or the amount of the living culture inoculated on the other. One strain (No. 694 referred to above), of uncertain authenticity, was wholly non-virulent. *J. T. Duncan*

Negroni, P., Daglio, C. A. N. & Briz de Negroni, C. Estudios sobre el *Coccidioides immitis* Rixford y Gilchrist. V. Primera investigación sobre la existencia de una endemia de coccidioidomicosis en la Argentina. [**Studies on *Coccidioides immitis* Rixford and Gilchrist. V. First Investigation on the Existence of an Endemic Focus of Coccidioidomycosis in Argentina.**] *Rev. Argentina Dermatosifilologia.* 1948, July–Dec., v. 32, Nos. 3/4, 250–63, 8 figs. [25 refs.] English summary.

The discovery, mainly through the use of the coccidioidin skin-sensitivity test, of widespread, mild or subclinical coccidioidal infection in endemic areas in the United States, where hitherto the disease, known only in its grave disseminated form, was considered to be relatively rare, prompted a similar kind of investigation in South America. Although coccidioidal granuloma was first identified in Buenos Aires by Posadas in 1891, less than a dozen cases of the disease were reported in South America during the following half-century. The identification of a case of coccidioidomycosis in Rio Colorado, Argentina, in October, 1947, provided the opportunity to investigate the possible existence of an endemic focus of the disease in the neighbourhood. For this purpose the coccidioidin skin-sensitivity test was carried out on children in the primary schools. In the first school dealt with, in Rio Colorado, 15 out of 190 children (7·97 per cent.) were found to be coccidioidin-sensitive and one child aged 11 showed an intense reaction. Out of 1,834 primary school children examined in General Conesa, Rio Colorado, Choele Choel, Stefenelli, General Roca and Neuquén, 137 had, apparently, suffered from asymptomatic coccidioidomycosis. In all, 2,065 school children of ages ranging from 6 to 15 years, were examined by means of the coccidioidin test. Of these the highest proportion of reactors was found in Rio Colorado, where 10·26 per cent. positive and 5·41 per cent. doubtful reactors occurred amongst 562 children. In Stefenelli with Gral Roca the corresponding figures were 1 per cent. and 1·66 per cent., respectively, and in other areas the proportion of positives ranged from 4·34 per cent. to 7·56 per cent. Children in the Rio Colorado area gave not only the highest incidence of reactors but also the greatest frequency of strong reactions.

Judged by the incidence of reactors, the geographical, geological and climatic factors influencing the distribution of the disease were those associated with the arid, steppe-like regions. It is proposed, therefore, that irrigation should be a first step in dealing with the problem.

Apparently, a study of the desert rodents was not included in the survey. [See also this *Bulletin*, 1949, v. 46, 167.] *J. T. Duncan*

Negroni, P. & Briz de Negroni, C. Estudios sobre *Coccidioides immitis* Rixford y Gilchrist. VI. Segunda contribución al estudio de la endemia coccidioidomicotica Argentina. [**Second Contribution to the Study of Coccidioidomycotic Endemiology in Argentina.**] *Rev. Argentina Dermatosifilologia.* 1948, July–Dec., v. 32, Nos. 3/4, 264–6. English summary (7 lines).

This paper is a sequel to the recent report [above] on the examination of primary school children in Argentina, by means of the coccidioidin skin test.

The present report deals with the results of similar tests on adults. Reference is made to an earlier study of 6 cases of coccidioidal disease (Negroni's paper II, above), in persons who had resided in the west of the Province of Córdoba, in the central Pampas and in the Territory of the Rio Negro, in areas corresponding in climatic and geological characters to the endemic areas of coccidioidomycosis in the south-western United States.

The present survey embraced 305 adults—175 males and 130 females—who were inmates of five hospitals. Twenty-five of these were coccidioidin-positive and 12 others gave doubtful reactions. Of the two sexes, 11·53 per cent. of the females and 5·71 per cent. of the males were reactors. The distribution, by residence, of persons giving the most marked reactions (++) pointed to possible endemic foci in the south and west of the Province of Buenos Aires and the desert areas of the steppe and hill country. *J. T. Duncan*

FRIEDLANDER, J. & MOSS, C. **Chromoblastomycosis.** *South African Med. J.* 1949, Sept. 3, v. 23, No. 36, 736–7, 3 figs.

"A case of chromoblastomycosis occurring in an Indian is described. The condition was an extensive one, involving the right leg (which was amputated), the amputation stump, right hand, forearm, arm, anterior surface of the right upper chest and the left hip."

WHITAKER, H. W., Jr. **North American Blastomycosis. Report of a Case in which a Patient with Meningeal Involvement was treated with Streptomycin and Promin.** *Arch. Pathology.* 1949, Sept., v. 48, No. 3, 212–17, 2 figs. [Refs. in footnotes.]

"The literature of systemic blastomycosis with meningeal involvement is reviewed, and an additional case, in which the patient was unsuccessfully treated with streptomycin and promin, is reported in detail."

TROPICAL OPHTHALMOLOGY

A REVIEW OF RECENT ARTICLES. LIII*

Trachoma.—Trachoma in Afghanistan is discussed in a brief article by BAUM.[1] The disease is very widespread and was present in 85 per cent. of all cases. It occurs in very severe forms and a very great number of all those afflicted go partly or totally blind largely due to lack of even the most elementary rules of hygiene and adequate treatment.

In Afghanistan the disease is spread from one eye to another by flies and repeated wipings of the secretion with dirty rags or the gowns of the women. The latter are used for every possible purpose, including blowing of noses and cleaning the eyes of children.

The author considers that the disease is curable provided regular treatment is started in the initial stage and carried on for many months. Prevention of trachoma will only be possible when hygiene can be taught to the inhabitants not only by a doctor but through schoolteachers, church and district officials.

---

*For the 52nd of this Series see Vol. 46, pp. 667–671.

[1]BAUM, F. L. Trachoma in Afghanistan. *South African Med. J.* 1949, Mar. 19, v. 23, No. 12, 214–15.

A preliminary report on the use of Solufontamide in trachoma is reported by KADER and RADWAN.[2]

This drug is a 33 per cent. solution of Fontamide (p. amino-benzene-sulphonyl-thiourea). It is a clear, slightly viscous and practically colourless liquid with a density of 1·16 at 15°C. and a *p*H varying from 6·8 to 7·2. The investigation was carried out in Egypt on 60 patients. Usually six subconjunctival injections of one-half to one cubic centimetre each were given in the upper fornix. Two injections were given each week. Treatment was ambulatory and patients were allowed to go home immediately after the administration of the subconjunctival injection.

Very good results were obtained in cases of follicular trachoma, trachomatous ptosis, trachomatous pannus, corneal ulcers and infiltrations and keratitis.

Solufontamide, in addition to its curative effect, is better than other sulphonamide compounds because the subconjunctival injections are painless. It may produce a slight chemosis and subconjunctival ecchymosis which disappear in a few days. No toxic effects occur from its use.

Kerato-Conjunctivitis.—Three cases of kerato-conjunctivitis in Hawaii, due to the juice of the crownflower *Calotropis gigantea* are reported by WONG.[3] In the cases described the milky juice entered the eye when an overhead flower was plucked. The juice contains a powerful toxin which is capable of causing a severe kerato-conjunctivitis, denudes the epithelium of the cornea and conjunctiva, penetrates the cornea and causes an oedema of the corneal substance which results in large folds in Descemet's membrane. There is also an accompanying miosis and congestion of the iris. The marked reduction in vision in the patient is due to the change in the refractive media by the oedema of the cornea. The visual impairment is temporary and varies in duration from five to seven days. There is no permanent injury to the eyes. Treatment is symptomatic.

Trypanosomiasis.—Lesions of the optic nerve in African trypanosomiasis are discussed by TOULANT, LARMANDE and TOULANT.[4]

In French tropical Africa, it would appear that affections of the optic nerves are very frequent, but the part that the trypanosome plays in the different lesions is still confused.

BERTRAND [this *Bulletin*, 1935, v. 32, 476] in 1935 found 40 lesions of the optic nerve, of which 16 were blind, in 707 inhabitants of Tchoho and 12 cases of optic atrophy in 773 inhabitants of Peida (Togo).

LEFROU and GOARNISSON [this *Bulletin*, 1939, v. 36, 738] at Onagadougou (Ivory Coast) have examined the eyes in 1,232 cases of trypanosomiasis and found ocular lesions in 31 per cent. of recent cases and 20·1 per cent. in old cases. But in 537 cases in which the trypanosome was not found similar ocular lesions were present in 22·3 per cent. The lesions found were optic neuritis or papillitis, papillary oedema and optic atrophy.

The two first are found in the second period of the disease and are due to vascular lesions or the presence of the trypanosome in the sheaths of the optic nerve. In sleeping sickness, vascular lesions are characteristic and the trypanosome has actually been found by pathological examination in the sheath of the optic nerve and also in animal experiments.

These two lesions are not serious and usually clear up rapidly without going on to optic nerve atrophy.

---

[2] KADER, M. A. & RADWAN, M. H. Preliminary Report on the Use of Solufontamide in Trachoma. *J. Roy. Egyptian Med. Ass.* 1948, Nov., v. 31, No. 11, 896–9.

[3] WONG, W. W. Keratoconjunctivitis due to Crownflower. *Hawaii Med. J.* 1949, May–June, v. 8, No. 5, 339–41, 1 fig.

[4] TOULANT, P., LARMANDE, A. & TOULANT, M. Les lésions du nerf optique au cours de la trypanosomiase africaine. *Bull. Acad. Nat. Méd.* 1949, v. 133, Nos. 23/24, 479–84. [40 refs.]

Atrophy of the optic nerve is very commonly found in the ordinary routine examination of eyes in tropical Africa. According to Bertrand, the percentage is from 1·4 to 3·4.

Lefrou and Goarnisson found percentage to be 1·6 in cases in which the trypanosome was not found and in cases in which it was found the percentage was 2·5 in first cases and 3·5 in old cases. The atrophy is either post-neuritic or primary and can be either partial or complete. Sometimes the optic atrophy is accompanied by choroido-retinitis. It is, however, questionable whether the choroido-retinitis is a result of the optic nerve lesion or the actual presence of the trypanosome or to the presence of another infection such as onchocerciasis.

In tropical Africa the causes of optic nerve lesions are numerous and so the part played by the trypanosome is uncertain. Laveran and Mesnil in their classical monograph in 1904 do not mention ocular complications in trypanosomiasis. Brumpt and Munaz scarcely mention them. Ridley [this *Bulletin*, 1946, v. 43, 534] attributes most of the blindness to onchocerciasis. Goarnisson states that ocular manifestations are slight and unimportant. On the contrary other authors consider that ocular manifestations are commoner than one is led to believe. Damas Mora [this *Bulletin*, 1934, v. 31, 576] and Habig consider that 80 per cent. of old cases of trypanosomiasis have narrow retinal blood vessels. Biopsy examinations prove that ocular complications are rare, although the trypanosome can invade the sheath of the optic nerve and retina. The question also arises whether the lesions are due to the direct action of the trypanosome or of a toxin produced by it or allergic reactions produced by the destruction of the trypanosome by drugs, or to arachnoiditis involving the optic chiasma.

Other lesions of the optic nerve in tropical Africa, which cause confusion with those caused by the trypanosome, are due to treatment with the arsenical preparations atoxyl and tryparsamide. Injections with these drugs have produced permanent defects of vision or blindness. The doses should be small and the preparations freshly prepared and even then, optic nerve lesions occur, due to hepatic insufficiency. Onchocerciasis has been attributed as a frequent cause of optic nerve atrophy in cases of trypanosomiasis in the Gold Coast.

Syphilis gives the same ophthalmoscopic picture as trypanosomiasis among different workers and 20 per cent. of cases of trypanosomiasis have shown a positive reaction to syphilis. Ankylostomiasis, although common in tropical Africa, cannot be considered a cause of optic nerve lesions.

Vitamin deficiencies are very common among the peoples of tropical Africa and are responsible for lesions of the optic nerve and if they do not explain all the lesions, they at least can favour the appearance of ocular complications in the course of trypanosomiasis as they do in arsenical intoxications.

Myiasis.—A case of ocular myiasis in Gibraltar is reported by Cass.[5]

The patient was a healthy Spaniard of 35 years of age. Eleven maggots in all were found in the conjunctival sac ; some of these had burrowed into the conjunctiva. The larvae were identified as those of *Phlebotomus* (sand-fly). [Species not stated.] It is probable that the small fly entered the eye with dust and the eye became immediately painful. The pain became intense with swelling of the eyelids, blepharospasm and photophobia. The conjunctiva was oedematous and very inflamed. After removal of the maggots under cocaine anaesthesia the inflammation quickly subsided.

The most common fly which causes myiasis belongs to the Muscidae, among which the common house fly is the most usual cause of the trouble. If these

[5]Cass, E. E. A Case of Ocular Myiasis. *Brit. J. Ophthalm.* 1949, June, v. 33, No. 6, 385–6.

flies do lay their eggs in the conjunctival sac, the majority lay them on the surface of the conjunctiva, but some are more dangerous, as these maggots burrow below the conjunctiva and penetrate the globe.

The Oestridae possess ovipositors and can lay their eggs beneath the conjunctiva itself and one of them, *Hypoderma bovis*, can penetrate the globe. Such cases of intra-ocular myiasis are very rare.

The Sarcophagidae and Anthomyidae can also infect the conjunctiva of man.

Cysticercosis.—This article by JUNIOR[6] represents the experiences of the ophthalmologists and pathologist of the Instituto Penido Burnier with 111 patients bearing 116 ocular cysticerci. The parasites were situated as follows :—51 in the vitreous ; 10, subhyaloid ; 44, subretinal ; 2 in the anterior chamber ; 7, conjunctival ; 1 in the orbit ; and 1, subcutaneous in the region of the lacrimal sac. The youngest patient was aged 2½ years, the oldest was 66 years of age. There was a slight predominance in women—64 female and 47 male patients. Ocular cysticercosis is a rare disease (116 in 54,000 patients). The majority of the patients were labourers or farm workers who came from rural areas and whose concepts of hygiene were primitive.

Ocular cysticercosis obeys the same laws of general infestation as *Cysticercus cellulosae*, the larva of *Taenia solium*.

Heteroinfection is more common than autoinfestation. The parasite is found in all the tissues of the eye except the lens. When intraocular, the first symptom is reduction in vision. During the first months of infestation, if the media are clear, the cysticercus can be positively identified by its bluish-white spherical vesicle with peripheral iridescent reflexes and slight undulatory movements. The scolex when evaginated reveals the sucking cups and when invaginated appears as a denser white spot in the centre of the vesicle. When the media are more turbid, diagnosis is more difficult, as the parasite causes an exudative choroiditis and even panophthalmitis. Detachment of the retina, synechias of the iris, complicated cataract and atrophy of the eyeball may occur. The parasite is more often encountered in the inferior vitreous. In 73·2 per cent. of cases the complement fixation reaction in the blood is positive and so is a valuable aid in diagnosis.

Treatment consists in early extraction of the organism, living or dead, as it is destructive to the eye.

Localization of the parasite with non-perforating diathermic cauterizations nearer and nearer to the vesicle should be done until the exact place has been accurately found by ophthalmoscopic examination. It is then removed by the transcleral route. *E. O'G. Kirwan*

TROPICAL ULCER

BERRY, W. T. C. **Tropical Ulcer : Studies in its Causation.** *J. Roy. San. Inst.* 1949, Sept., v. 69, No. 5, 625–32. [10 refs.]

Tropical ulcer is defined as a sloughing pyogenic lesion, most common on the leg below the knee and usually associated with fusiform bacilli and spirochaetes. The author remarks that probably more money is spent on its treatment than on that of any other single tropical disease and that even if it is treated with success a scar is left which is always liable to break down and lead to deformities. Healthy subjects appear to be relatively resistant to infection,

[6] JUNIOR, L. Ocular Cysticercosis. [Translated by Charles A. PERERA.] *Amer. J. Ophthalm.* 1949, Apr., v. 32, No. 4, 523–47, 23 figs.

and it has been suggested that a deficient dietary is a predisposing cause, but there is much difference of opinion as to the factors responsible.

The incidence of ulcer was studied in a fishing village on the shores of Lake Nyasa and in a hill village on the escarpment of the Great Rift Valley, flanking the lake. It was found that although typical ulcers occurred in the hill village and not on the lake shore there were important differences, besides diet, between the living conditions of the two groups. The rainfall was different, there were many more flies in the hills than on the lake shore, and owing to the terrain the nature of abrasions was most severe in the former, being more apt to cause bruising of underlying tissue. The author carried out investigations in the hill village. Forty children were fed with boiled dried meat thrice weekly and the amount was adjusted so as to supply an average of 1·5 grammes of animal protein per kilo. body weight daily. It was estimated that an equal or greater amount of vegetable protein was already given in the daily diet. Two control groups were used and it was found that there was no difference between the three groups in relation to total abrasions, the time they took to heal, and the number progressing to ulceration.

A group of children was fed for five months on a supplement of baker's yeast; they were given an average daily intake of 0·495 mgm. thiamin, 1·02 mgm. riboflavin and 16·6 mgm. nicotinic acid. The test was carried out at the height of the ulcer season and no controls were used, but the results did not appear to show any advantage in these supplements.

The exudate from 795 consecutive abrasions was stained by Gram's method. Abrasions were at first infected with cocci only, but a typical infection of fusiform bacilli was superimposed in 120 instances, this being usually followed by a deterioration in the local condition: it was commoner in the wet than the dry season, while a higher percentage of abrasions healed spontaneously in the latter season. It was considered that muscid flies, more common in the rains, acted as vectors. In one experiment containers filled with fresh blood, faeces, rotten fish and pus from ulcers were placed together in the open and the flies (*Musca sorbens*), although they might alight on one of the first three containers, almost at once moved on to the pus. As a result of three years' work the author was deeply impressed by the importance of non-dietetic factors in the causation of tropical ulcer.

A small area over the external malleolus of volunteers was infiltrated with 2 per cent. novutox and the outer skin gently picked away until the blood vessels showed pink through the corium; pus from a well-established ulcer was smeared on the area and the site protected by a small cardboard cage fixed by a piece of elastoplast which did not pass completely round the leg; the subject carried on his work as usual. Seven cases so treated developed ulcers. One volunteer was successfully inoculated over the external malleolus, but inoculation over the condyles of both humeri failed. Another who was successfully infected over both external malleoli was treated for three days with one leg raised on a Thomas's splint and the other kept lowered to ground level. It was found that when, after this, both legs were raised the former healed more rapidly than the latter. Two Africans with a severe chronic Vincent's infection of the gums were inoculated on the leg with the exudate, but the results were negative. A plea is made for the more extensive trial and investigation of inoculation of volunteers.

A marked difference appears to exist in the severity of this condition in different parts of the world [*cf.* James, this *Bulletin*, 1938, v. 35, 828]. The author suggests that subjects with inadequate intake of the vitamin B complex are hampered in dealing with anaerobic organisms by failure of reduction-oxidation reactions and that the tissues of the leg are at a disadvantage with

those of the arm owing to delay in the superficial venous and lymphatic return, this being possibly accentuated by a mild anaemia.

In the ensuing discussion, AMELI (Iran) drew attention to the fact that tropical ulcer was unknown in most parts of Iran, but was prevalent on the shores of the Persian Gulf where the climatic conditions were quite different from those in the rest of the country and where, moreover, fresh fruit and vegetables were scarce and expensive. He thought that fusiform bacilli and spirochaetes were secondary infections and that some other, probably ultramicroscopic, organism was responsible. PROCTOR (observations in Kenya) considered that there was always a dietetic basis to the causation of tropical ulcer, and asked whether lack of vitamin C might not be a predisposing factor.

In reply, Dr. Berry said that while no definite proof had been obtained of a specific dietetic cause, yet faults in the diet were so commonly found in association that there was almost certainly something in this. Panda in India had produced ulcers by inoculation of cultures of fusiform bacilli which suggested that ultramicroscopic organisms were not essential. BAKER in Somaliland had concluded that shortage of vitamin C was not a causative factor.

C. F. Shelton

BOIVIN. Le traitement des ulcères tropicaux par les injections intra-artérielles d'Exadyl et de novocaïne et les infiltrations sympathiques lombaires. [**Treatment of Tropical Ulcer with Intra-Arterial Injections of Exadyl and Novocaine and Sympathetic Lumbar Infiltration.**] *Ann. Soc. Belge de Méd. Trop.* 1949, June 30, v. 29, No. 2, 91–7.

Exadyl, an amido phenyl hexane compound, occurs in the form of a white odourless powder, soluble in cold water in a 7 per cent. solution, very soluble in warm water and warm alcohol, and is administered in a 0·1 per cent. solution. The vehicle is not mentioned—presumably it is distilled water or normal saline.

Injections are given twice daily during treatment in 20 ml. amounts followed by an injection of 1 per cent. novocaine (20 ml.), which, according to the author, is followed by a local rise of temperature accompanied by vaso-dilatation. In very nervous patients a preliminary subcutaneous anaesthesia is administered. In two very severe cases a paravertebral infiltration was given in addition to the intra-arterial injections.

The pulsations of the femoral artery are palpated below the crural canal. A lumbar-puncture needle is used and the left index and middle fingers are placed at the level of the artery while the right hand pushes the needle obliquely inwards to a depth of about 2 or 3 cm.; on withdrawing the stilette blood spurts out. The syringe containing the solution is attached and, to make certain that the artery has not been transfixed, pressure is stopped after 1 or 2 ml. have been injected and blood flows back into the solution. After injection the patient remains at rest in the horizontal position for ten minutes with a pad fixed to the site of injection. Paravertebral infiltration with 1 per cent. novocaine is carried out according to the standard technique, a Tuffiers's needle being used. Exadyl does not cause any toxic reactions.

Phagedaenic tropical ulcer is greatly improved by intra-arterial injections of this drug with novocaine given by the same route or by paravertebral infiltration as an adjuvant. In addition local treatment and administration of bismuth should not be neglected. As the author remarks, the numbers of treatments recommended for tropical ulcer are legion and he considers that their very diversity is a proof of their lack of specificity.

[No mention is made of the possibility of a weak patch occurring in the artery as a result of frequent punctures.] *C. F. Shelton*

MISCELLANEOUS DISEASES

BEET, E. A. **Primary Splenic Abscess and Sickle Cell Disease.** *East African Med. J.* 1949, July, v. 26, No. 7, 180–86. [10 refs.]

An African male, aged 25, was admitted to hospital at Broken Hill in Northern Rhodesia on January 24, 1949. A week before admission he developed a headache, the next day complained of pain in the left side and on palpating this area he felt a tender mass " like a stone ". The mass increased in size, breathing became difficult and three days before admission he noticed that his conjunctivae were beoming yellow. In 1942 the patient suffered from a left-sided pneumonia and the author suggests that this may have been a splenic infarct.

On admission there was marked wasting with pronounced jaundice of the conjunctivae and pallor of the mucous membranes, the spleen was very enlarged and tender and immobile on respiration, the liver was not enlarged. The patient was afebrile, but looked ill and was in great pain.

Blood count : Red cells 2,800,000 per cmm., leucocytes 18,000 (neutrophiles 78 per cent.), haemoglobin 8·12 grammes per 100 ml. (Sahli), colour index 1·04, reticulocytes 2 per cent. The red cell morphology was normal and no nucleated red cells, sickle cells or malaria parasites were found. In a sealed preparation of blood 90 to 100 per cent. of red cells showed sickling within four hours. The direct Van den Bergh and Kahn tests were negative.

On January 29 the splenic swelling was softening below the costal margin and there was a definite tympanitic note over this organ, while the temperature was rising and the patient's condition deteriorating. Aspiration 1½ inches from the mid-line just below the costal margin produced foul-smelling gas followed by 28 oz. of reddish brown pus : 200,000 units of sodium penicillin was instilled into the abscess cavity. On January 31, although the general condition had improved and the temperature had fallen, the spleen was still very tender and a drainage tube was stitched into the abscess ; 29 oz. of pus were evacuated and continuous drainage into a bedside bottle was begun, 40 oz. of pus subsequently draining away. On February 4 the condition had again deteriorated and the abscess was again drained, much pus being found ; a drainage tube was inserted. This drain was removed on February 16 when the condition had greatly improved, the jaundice become less and the spleen smaller and not tender.

On March 8 the patient was up and convalescent ; the spleen was still palpable but not tender and the wound was dry. Red blood cells were 4,350,000 per cmm., leucocytes 6,800 per cmm., sickling rate and red cell morphology as before. When last seen on March 17 the patient looked well but was still thin.

Penicillin was given intramuscularly every three hours for 11 days up to a total of 4,160,000 units of the sodium salt and ferri et ammon. citrate in a mixture, 90 grains daily, was administered from January 28 to March 10.

The amount of pus drained is remarked upon, 141 oz. being measured although the actual amount was probably much in excess of this. The jaundice was considered to be due to an acute haemolytic process and a sickle cell anaemia was ruled out on the following grounds—absence of sickle cells and nucleated red cells in blood smears, absence of reticulocytosis, no sickling present after one hour in the sealed preparation of capillary blood, rapid increase in the red cell count after adequate drainage of the abscess and administration of iron and fall in the leucocytosis as the patient's infection was overcome. As noted, a haemolytic anaemia can follow an infection with anaerobic haemolytic streptococci and *Cl. welchii*.

The author however considers that this case was due to an infection of an infarct of the spleen, the latter being due to sickling within this organ. Owing

to the sluggish circulation in the splenic pulp conditions are favourable to a degree of anoxia sufficient to cause sickling in susceptible red cells, the sickled cells becoming entangled and causing still greater anoxia, thus predisposing to the formation of an infarct which may become infected and go on to abscess formation.

[As this condition has not, apparently, been previously recorded in East Africa the clinical picture is fully described.] *C. F. Shelton*

Turiaf, J., Blanchon, P. & Cabail, J. L. Syndrome de Löffler (formes aiguës fébriles et formes mineures). Asthme et ascaridiose. [**Löffler's Syndrome (Acute Febrile Forms and Minor Forms). Asthma and Ascariasis.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1948, Nos. 36/37, 1204–14.

The authors have used five cases as a basis for a discussion on Löffler's syndrome.

Case (1). The patient had severe asthma-like attacks associated with fever and eosinophilia. X-ray showed lung infiltration which had completely cleared in two months. The eosinophilia resolved and there was a lymphocytic reaction. There were no ova in the stools and chenopodium produced no worms.

Case (2) was a true asthmatic who had an attack of Löffler's syndrome with fever ; eosinophilia 63 per cent. reduced to 21 per cent. within a month and to 2·5 per cent. after two more months. Lung fields cleared in about a month. No *Ascaris* were found at the time, but one was passed 18 months later.

Case (3). A woman aged 21 who had a history of asthma since the age of five. She had a febrile attack with lung symptoms, but no asthmatic attacks. There were two areas of infiltration in the left lung, in the sub-clavicular area and at the base. The blood picture was at first normal, but later she developed an eosinophilia (14 per cent.). The stools showed both *Ascaris* and *Trichuris*. Pulmonary tuberculosis was excluded. The lung fields cleared within two months, but about three months later she had another febrile attack, this time without X-ray evidence. Later, the asthmatic attacks returned and persisted despite treatment, but the lung fields were still clear. Both worm infections persisted.

Case (4). Developed asthmatic attacks at the age of 23 years. Several attacks had occurred during the year, but no typical asthmatic history and no associated allergic diseases, or family history were present. When seen a year later the patient had an attack associated with a temporary infiltration of the lung, and an eosinophilia of 17–20 per cent., ending at 13 per cent. with a lymphocytic reaction up to 50 per cent. No *Ascaris* were found.

Case (5). A youth of 16 developed his first attack when he had been in Paris for one month. Loss of weight was present, but neither fever nor night sweats : there were asthmatic attacks. Two episodes of infiltration occurred but with little eosinophila and that only at second attack (8 per cent.). No *Ascaris* were found.

The authors first point out that acute febrile forms are not as rare as they are generally considered to be. They may take the form of an acute "*pneumopathie*" or of a minimal transient lung infiltration with the characteristic radiological and blood pictures. A severe case may simulate acute tuberculosis or may have most of the characteristic signs of true lobar pneumonia. In the minor forms, the diagnosis depends entirely on the radiological picture of small round, sometimes very homogeneous, lesions, which may be mistaken for small tuberculous foci, but which resolve rapidly and compel a revision of the first impression, and the associated sharp but transitory rise in the eosinophile count.

In their five cases the left lung was involved in four ; other writers have made a point of the frequency of right lung involvement. They noted a high leucocytosis (33,400 with 93 per cent. granulocytes and 63 per cent. eosinophils in one case) and, in three of their cases that were followed for a sufficiently long time, a terminal lymphocytosis.

On the subject of aetiology they point out that in only two of the five cases was *Ascaris* demonstrated despite the careful and systematic search. They cannot accept the view that Löffler's syndrome can be explained wholly by pulmonary ascariasis for this and for other reasons which they give. They consider that transient eosinophilic pulmonary inflammations of an allergic and not a mechanically irritative nature are caused by a variety of allergens, exogenous or endogenous, and that in the lungs of asthmatic subjects these allergens find a particularly favourable nidus. *L. E. Napier*

PROTOZOOLOGY : GENERAL

FRENKEL, J. K. **Pathogenesis, Diagnosis and Treatment of Human Toxoplasmosis.** *J. Amer. Med. Ass.* 1949, May 28, v. 140, No. 4, 369–77, 5 figs. [Refs. in footnotes.]

Four clinical types of *Toxoplasma* infections in human beings are recognized, *viz.* (*a*) congenital or neonatal meningo-encephalitis, (*b*) atypical encephalitis, (*c*) post-encephalitic sequelae, and (*d*) pneumonitis associated with fever and a rash.

A historical account of toxoplasmosis in animals and man is given, much condensed but with numerous useful references to original sources.

The pathogenesis of the infection is next considered under the heads " acute ", " subacute " and " chronic " toxoplasmosis.

Acute toxoplasmosis

The acute infection is generalized, involving every organ and most tissues although the lesions are microscopic. *Toxoplasma* bodies are found to proliferate in macrophages, fibroblasts, reticular and sinusoidal cells, alveolar lining cells in the lungs, smooth and cardiac muscle, and neuronal and microglial cells of the central nervous system. The clinical symptoms produced may be interstitial pneumonitis, myocarditis, encephalitis, splenitis, hepatitis and orchitis while a cutaneous rash and icterus may be present. Too few human cases in the acute stage have been examined to evaluate the factors operating to cause the various organic lesions but age seems to be an important factor as the lesions found at autopsy seem to be more severe and extensive in infants than in adults. It has also to be remembered that the acute stage may be symptomless, especially in adults, and may cause no disease.

Subacute toxoplasmosis

This term designates cases in which the infection is regressing in extra-neural tissues, but continues active or even progressive in the central nervous system and eyes. Most of these cases will have been antenatal or neonatal infections. *Toxoplasma* bodies are not found in the extra-neural tissues, but in the central nervous system microglial nodules are present, associated with the presence of *Toxoplasma* bodies. The absence of *Toxoplasma* bodies from the extra-neural tissues may be explained by the presence there of an acquired immunity, whereas this is absent or ineffective in the central nervous system owing to

poor diffusion of serum antibody into brain substance. Another characteristic lesion in the brain is a periventricular reaction zone surrounding the lateral and third ventricles. This consists of four strata indicating, in succession, cellular infiltration and microglial proliferation, thrombosis of large vessels, cellular necrosis and repair.

The clinical symptoms and signs of subacute toxoplasmosis are hydrocephaly and convulsions, chorio-retinitis, retinitis and iridocyclitis. The outcome in subacute cases is often fatal.

Chronic toxoplasmosis

This term designates cases where there is clinical or laboratory evidence of toxoplasmosis but no obvious widespread activity. *Toxoplasma* bodies have not been isolated from such cases and so the question of their persistence or otherwise cannot be answered. The recurrence of active chorio-retinitis in patients showing the scars of subacute toxoplasmosis would favour the theory of persistence as would the occasional finding of apparent *Toxoplasma* pseudocysts in routine autopsy material. The clinical signs and symptoms of chronic toxoplasmosis depend on the damage produced during the acute and subacute stages. The most frequent findings are chorio-retinitis, electro-encephalographic evidence of cerebral damage, cerebral calcifications and other signs such as microcephaly, hydrocephaly, ocular malformations and spastic paraplegia.

Transplacental toxoplasmosis

There is much direct and indirect evidence of the antenatal infection of cases and the question arises as to whether the mother contracted toxoplasmosis during pregnancy or had a previous latent infection, allowing a ruptured pseudocyst to infect the foetus *via* the placenta.

Diagnosis

The isolation of *Toxoplasma* from the patient is the final proof of infection, but this is not always possible and immunological and serological procedures of diagnosis have to be undertaken.

Toxoplasma can be isolated in acute cases from the blood, bone marrow, spleen, cerebrospinal fluid and, possibly, sputum.

In the subacute stage the bodies have been found in ventricular fluid and in the brain at autopsy.

Direct demonstration of the bodies in smears is rarely possible except from sedimented ventricular fluid, and animal inoculations must be resorted to. Groups of various animals should be used, mice, hamsters and guineapigs, sub-inoculations being carried out if necessary.

The tests to be carried out when no organism can be isolated vary and are enumerated below without details. For these the original descriptions, to which references are given, should be consulted.

The tests denoted are an antigenic test for the demonstration of *Toxoplasma* antigen in ventricular fluid of infants with hydrocephalus, cutaneous tests with *Toxoplasma* antigen (*toxoplasmin*), an *in vitro* test for hypersensitivity to *Toxoplasma* antigen, a *Toxoplasma*-neutralizing antibody test (Sabin & Ruchman) and a *Toxoplasma* complement-fixation test.

Treatment of Toxoplasmosis

Sulphadiazine and sulphamerazine are found to control the infection in animals and the successful treatment of a child has been reported. None of the modern antibiotics has proved effective. In spite of treatment pseudocysts may persist in the brain and possibly give rise to a relapse.

The account ends with a useful summary, in tabular form, of the findings described. *H. E. Shortt*

Cross, J. B. & Anigstein, L. **The Inflammatory Reaction to Toxoplasma in the Omentum and Peritoneal Fluid of the Mouse.** *Amer. J. Trop. Med.* 1949, July, v. 29, No. 4, 473–81, 1 graph & 6 figs. on 1 pl. [12 refs.]

This is an account of the inflammatory reaction in the peritoneal cavity of mice after intraperitoneal inoculation of *Toxoplasma*.

The inocculum used was an " emulsion " of infected mouse brain in Tyrode's solution.

Eighteen mice were infected and the findings in the peritoneal fluid and omentum recorded at intervals of 4, 8, 12, 24, 48 and 72 hours. The conclusions, summarized below, appear to have been based on this single experiment and no controls appear to have been used, since examination of the peritoneal fluid and omentum of normal mice could hardly be so considered.

After four hours the inoculum had disappeared although rare free forms of *Toxoplasma* were seen then and at 8 hours. After 12 hours, intracellular forms were seen in cells of the omentum while after 48 hours numerous free forms were seen both in omentum and in the peritoneal fluid. After 72 hours there was wide dissemination of parasites both in the omentum and in the peritoneal fluid which had increased in amount to 0·5 ml. *H. E. Shortt*

ENTOMOLOGY AND INSECTICIDES: GENERAL

Holstein, M. Notes sur la biologie d'*Aedes aegypti* en Basse Côte d'Ivoire. [**Biology of *Aëdes aegypti* on the Ivory Coast.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 180–83.

This is a description of two kinds of breeding places of *Aëdes aegypti* in the Ivory Coast ; one is common between Abidjan and Grand Bassam and consists of thousands of abandoned coconut shells left on the ground in which the mosquito is able to achieve its life cycle from egg to adult in little more than a week. The water in some shells may contain as many as 400 larvae and pupae, all of them *Aëdes aegypti*. In this area adult mosquitoes invade the houses between 5 p.m. and 8 a.m.

The second area is in the forest region from Abidjan to Agboville and here the breeding places are formed in the piles of cocoa pods on the estates. The adult mosquitoes' behaviour is similar to that of those on the coast but they do not enter houses to the same extent ; instead they frequent the dense vegetation near the breeding places.

The paper contains a plea for some action to be taken to control these breeding places. *H. S. Leeson*

Bugher, J. C. & Taylor, Marjorie. **Radiophosphorus and Radiostrontium in Mosquitoes. Preliminary Report.** *Science.* 1949, Aug. 5, 146–7.

The authors have used radioactive isotopes of strontium and phosphorus, administered to the larvae, as a means of marking adult mosquitoes and studying range of flight and length of life. The method is to be preferred to spraying adult mosquitoes with pigments and releasing them. Both isotopes are absorbed by larvae from the water in which they are living, and can be traced later in the body (and especially the legs) of the adult mosquitoes. At the concentration which suffices for marking, the materials are not toxic.

After technical development in the laboratory the method was applied to many thousands of adult *Aëdes aegypti* which were released (near Lagos, it appears). Only a minute proportion were recovered (0·1 per cent. in the

largest experiment) ; [this is characteristic of all work done so far on marking mosquitoes, and makes one accept the results with slight hesitation]. The maximum age among females at time of recovery was 28 days, among males a few days only. The maximum distance from point of release was 3,800 feet. The " mosquitoes were distributed largely by wind drift rather than their own flight, although the latter contributed." *P. A. Buxton*

FORBES, J. & HORSFALL, W. R. **Biology of a Pest Mosquito common in New Guinea.** *Ann. Entom. Soc. Amer.* 1947, v. 39, No. 4, 602–6. [Summary taken from *Rev. Applied Entom.* Ser. B. 1949, July, v. 37, Pt. 7, 129–30.]

Aëdes scutellaris scutellaris, Wlk., is one of the most annoying pest mosquitoes in New Guinea and adjacent islands, where it is widely distributed. It is a sylvan species that is adaptable to domestic conditions. Small amounts of water in plant parts and in artificial containers are usual breeding places, and larvae were produced in large numbers in exposed supply and salvage dumps about army camps and once in bilge water in amphibious aircraft. Cartons contained a greater average number of larvae than metal containers, which varied in suitability. Those with lacquer linings were preferred to those without. Metal containers that had been blackened by burning were decidedly less attractive than others. Eggs were sometimes laid in a meniscus about emergent or floating objects or on moist surfaces above water level. Adults tended to remain near breeding-places. Marked females were collected 500 yards from the point of release, but it was observed in two different areas that females did not travel 800 yards in sufficient numbers to cause annoyance. Moderate breezes did not prevent feeding, but strong ones kept the mosquitoes from coming out.

The egg, larval and pupal stages occupied averages of 5, 5·2 and 2 days, respectively. The egg stage varied from 2 to 21 days when the eggs were kept in water continuously. One batch hatched in the laboratory after being kept for 61 days in a moist chamber before submersion. For eggs to remain viable for so long they must first have incubated on a wet surface long enough for the embryo to develop to the hatching stage. Some adults lived six weeks in the laboratory. The mean length of life of 33 females that had an opportunity to feed daily was 21·9 days. Pairing usually took place on the first or second day after emergence. The preoviposition period was about seven days but extended to 25 days in one case. Several batches of eggs may be laid by one female, and the mean number of eggs for caged females was 86.

SMITH, C. N. & BURNETT, D., Jr. **Effectiveness of Repellents applied to Clothing for Protection against Salt-Marsh Mosquitoes.** *J. Econom. Entom.* 1949, June, v. 42, No. 3, 439–44.

An account is given of tests made with approximately 3,400 compounds to assess their value as mosquito repellents when applied to clothing rather than to the skin.

Preliminary laboratory tests with *Aëdes aegypti* showed that 900 of these compounds complied with the minimum requirements in screening tests, namely fewer than five bites in one minute's exposure daily for ten days. Of these, 375 were available in sufficient quantity for testing in the field where *Aëdes taeniorhynchus* and sometimes *Aëdes sollicitans* were numerous. The repellents were applied in acetone solution at the rate of 3 gm. per square foot to stockings worn successively by three men for five minutes each.

The names are given of 230 of these compounds which were either ineffective or effective for named periods of less than 21 days ; 92 substances were effective

for 21 days or longer and the results obtained with these are tabulated. In this table 18 compounds are indicated as being apparently safe for use on clothing and as being still effective after 36 hours of wear ; but a warning is given that most of the substances require additional toxicological investigation before unrestricted use can be recommended. However, three of them were of special interest because they are also effective when applied to the skin ; these were, *n*-butyl ester of mesityl oxide oxalic acid (*Indalone*) ; *n*-propyl ester of *N*, *N*-diethylsuccinamic acid ; and ethyl ester of beta-phenyl-betahydroxy propionic acid. *H. S. Leeson*

Pelloux, A. & Decourt, P. Toxicité du S.N.P. sur *Argas persicus*. [**Toxicity of S.N.P. for** *Argas persicus*.] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 5/6, 187–90.

S.N.P. is an abbreviation for o′ diethyl o ″ para-nitrophenol. Some simple tests with small numbers of ticks are reported. Used as a dust at 0·25 to 0·1 per cent. and applied at 0·15 mgm. per sq. cm., S.N.P. killed all ticks in 48 hours.

An emulsion of S.N.P. sprayed on to ticks at 1 mgm. liquid per sq. cm. caused intoxication at all concentrations from 0·1 to 0·007 per cent. ; but the proportions which died over a period of four days were no higher than in controls. *J. R. Busvine*

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

Colonial Office. **Annual Report on the East Africa High Commission for its Inaugural Year 1948.** Colonial No. 245. 26 pp., 4 pls. 1949. London : H.M. Stationery Office. [9*d*.]

The East African High Commission was instituted to take the place of the pre-existing East African Governors' Conference ; it began to function on January 1, 1948. The Commission consists of the Governors of Kenya, Tanganyika and Uganda ; it maintains its own Secretariat, and it administers certain inter-territorial services. Among these are some which have a bearing on medical matters, particularly the Research and Scientific Services. The Agriculture and Forestry Research Organisation has acquired a large site near Nairobi for laboratories and experiment stations, along with the Veterinary Research Organisation, and the Agricultural Research Institute at Amani has been formally absorbed into it. The Veterinary Organisation has already undertaken research into the new drug antrycide.

The Tsetse Research Institute (Shinyanga), the Trypanosomiasis Research Station (Tinde) and the East African Tsetse Reclamation Department have been merged into one organization, which will co-ordinate research on tsetse flies and trypanosomiasis and their control, and will apply the knowledge gained to practical problems. Certain work already done is referred to—the confirmation that planned settlement is the real method of reclamation against *Glossina morsitans*, the finding that *G. palpalis* can travel along sheer clearings much further than had been expected, and that it can exist much further than was known from permanent water.

The report is brief, but informative. It will be interesting to see how this principle of inter-territorial co-operation expands in the future, and how vigorous an impetus this unification will give to the research which is so important a need in African development. *Charles Wilcocks*

Congo Belge. Direction Générale des Services Médicaux. Rapport annuel 1948. [**Annual Report of the Medical Directorate-General.**] 109 mimeographed pp., 2 folding maps & 3 charts.

The title of the Annual Report on the Public Health in the Belgian Congo [this *Bulletin*, 1949, v. 46, 415] has been changed in 1948 to that of Annual Report of the Medical Directorate-General: but apart from a valuable introductory chapter summarizing events of special importance and an additional chapter giving a statistical statement of the health of the population, the layout follows in general that of previous reports.

The Report contains the familiar detailed list of pestilential and infective diseases; descriptions of medical organizations, governmental and other; port, urban, industrial and general sanitation; and statistical appendices.

In the introductory chapter, attention is drawn to the considerable extensions to the hospital organization which have been made or are in contemplation: to discussions on closer medical cooperation with French Equatorial Africa: to the Inter-African Tsetse Bureau recently established in Léopoldville as a result of the Trypanosomiasis Conference in Brazzaville in 1948; to the campaign with DDT against the vectors of malaria and onchocerciasis: to chemoprophylaxis of malaria; to the acquisition of large quantities of sulphones for trials in the treatment of some of the 60,000 leprosy cases in the Congo: to the large scale attack on venereal diseases with sulphonamides and penicillin: and to an intensification of the campaign against tuberculosis. In connexion with the last-named subject an admirably realistic and cautious assessment of the problem is given. BCG vaccination after Mantoux testing has been adopted: and the Medical Department "*avec plus de circonspection, malgré la vogue actuelle de la méthode,*" have turned towards mass radiography, bearing in mind its limited application to the primitive local conditions as compared with conditions in Europe and America. It is maintained that this service should be ancillary to existing measures and should develop gradually with them: pilot services, of the order of one per Province, will be contemplated in the first instance with the aim of gradual expansion. One such post is already in operation and others are being established. It is pointed out that the most difficult part of the problem is the treatment of actual cases of tuberculosis. "Pneumology Services" are being developed in the principal hospital centres and will be developed as rapidly as possible.

The details of diseases show, in the main, no gross differences from those reported in 1947. The number of cases and deaths from *plague* were about halved; two cases of *yellow fever* in Africans were reported from the Eastern Province. There were 159 African and 98 European cases of epidemic *typhus*, with three deaths among the former. There were 30 European and 12 African cases of *fièvre rouge congolaise*. There were 7 cases of *sleeping sickness* in Europeans with no deaths.

A valuable feature of this section is the account of *schistosomiasis* to which more than two pages are devoted. In Europeans there were 162 cases of rectal and 2 of vesical schistosomiasis recorded from the "*postes fixes*": in Africans, the corresponding figures were 8,374 and 787, with four deaths from each type. It is stated that intestinal schistosomiasis is truly autochthonous, but that the vesical type is imported. The disease is limited to certain provinces and the various foci therein are listed in considerable detail. Reference is also made to additional local surveys, in particular in the fisheries around Lake Albert where 38 per cent. of cases of intestinal schistosomiasis were found among some 15,000 people: large-scale treatment with tartar emetic and anthiomaline was without incident: small-scale trials of Miracil D and Hexamidine are also

being made. Other foci, in Kasai Province, showed evidence of 8,115 new cases out of 105,701 persons examined (8 per cent.).

Eight cases of *rabies* were noted, all in Africans: it is noted that 5 were "*suivis de guérison*" [and were therefore presumably only suspected cases].

The usual full descriptions of the activities of the medical and health organizations are given. It is noted that over 79,000 laboratory examinations were made at the Léopoldville Institute during the year and some 57,000 of these were Wassermann reactions. The laboratories at Coquilhatville, Stanleyville, Elisabethville and the anti-plague centre at Blukwa accounted for over 125,000 examinations between them, in addition to the issue and use of large quantities of vaccines and sera. *H. J. O'D. Burke-Gaffney*

MALAMOS, B. **Tropical Diseases in Brazil.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1949, July, v. 43, No. 1, 11–30, 6 figs. on 2 pls. Discussion 30–32 [MANSON-BAHR, P. (President); NAPIER, L. E.; MCROBERT, G.; KIRWAN, E. W.; BARBER, C. H.; MALAMOS, B. (in reply)].

At the first General Conference of UNESCO (1946) the decision was made to set up an international scientific commission to investigate the question of the establishment of an International Scientific Institute for the Hylean Amazon [the area of tropical forest in the Amazon basin], and to establish a Field Science Co-operation Office for Latin America. Professor Malamos of Athens was asked to participate in these projects, and spent 13 months in Brazil making a survey which included the States of São Paulo and Minas Geraes, and the Amazon Valley.

The valley covers about 4½ million square miles, and includes parts of Bolivia, Peru and other countries besides Brazil. In the three Brazilian States (Para, Amazonas, Matto Grosso) the population is only 0·86 to 2·44 per square mile, and, in fact, when travelling by airplane "one sees for hours only virgin forest, in most parts of which no human beings have yet entered". About 40,000 miles of the Amazon and its tributaries are navigable on Brazilian Amazonian territory alone. The climate of the valley is hot, humid, tiring and monotonous, with little seasonal change.

The author describes briefly the public health organization of Brazil, and mentions the 11 medical schools and the various Institutes, some of which hold a high reputation for medical research and field activity. He then discusses some of the chief diseases from which these people suffer in their remote and scattered communities, where life is still primitive. Yellow fever, tuberculosis, malaria, leishmaniasis, Chagas's disease, the mycoses, helminthic diseases, smallpox, typhus, spirochaetoses, leprosy, the water-borne diseases, and affections caused by the venomous animals, make up a formidable list. But in spite of these, and of infant mortality rates varying in different places between 70 and 509 (in 1945), the population of Brazil is increasing by about one million persons each year. Most of the wealth of the country is still undeveloped.

The author has given a concise and readable account of the health conditions of Brazil. Such a conspectus is a useful reminder that we do not know enough of conditions in other countries. *Charles Wilcocks*

CLARK, H. C. **The Tropics and the White Man.** *Amer. J. Trop. Med.* 1949, May, v. 29, No. 3, 303–9. [12 refs.]

The author reviews the opinions of other writers on the subject of the white settler in the tropics; divergent opinions are expressed. He concludes that our knowledge of the effects of climate upon the northern white man is so

incomplete that no answer to the problem of the colonization of the tropics by the white man can be given except to cite the Dutch Colony on the Island of Kisson, where the original 16 settlers have increased to 300 strong sturdy colonists, in two and a half centuries, and the white settlers in Australia, Brazil and the Canal zone. " The facts only will be secured from a study of many later generations of such settlers".

He concludes his lecture by giving a personal medical history of his 37 years in the tropics ; since 1909 this includes traumatic appendicitis, bilateral otitis externa, bacillary dysentery, dengue (in Haiti), thyroidectomy, tonsillectomy, dengue (in Panama), and 16 *Dermatobia hominis* infestations. He also gives data reported during four " health audits " at different centres in the United States since 1933. All findings were within normal limits.

He adds " The tropics have been very good to me. However, I have been able to live a protected life in sanitated areas with proper food and water supply, and my duty has seldom required hours after sundown in an unsafe region. Nevertheless, I find it hard to believe that the time will ever come when it is necessary for the northern white race in vast numbers to colonize the tropics". *L. E. Napier*

BOOK REVIEWS

Pessôa, Samuel Barnsley. **Problemas brasileiros de higiene rural.** [Problems of Rural Hygiene in Brazil.] 582 pp., 91 figs. 1949. São Paulo : Indústria Gráfica José Magalhães Ltda., rua Spartaco 215.

It is difficult, nay more, impossible for those unacquainted with the country to gauge with any degree of accuracy the vast amount of work which the preparation and writing of this book must have entailed. We know of no other work on hygiene which covers quite the same ground or indeed deals with rural hygiene in quite the same way. For its general principles, the work is a model of what can be done by an intimate study of rural health problems, but there is such a wealth of local detail that we fear the book will be of great value to few outside the country with which it is concerned—Brazil.

The work as a whole comprises three main divisions, each of several chapters. Part I treats of the epidemiological aspects of disease in rural areas, the geography of the five regions into which the author divides the country : north, north-east, east, south, and west-central (that is, the west and most of the centre of Brazil) ; their populations, the economic and social conditions, migration, housing and food. In Part II certain endemic diseases are considered in detail : malaria, the leishmaniases, Chagas's disease, amoebiasis, yaws, pinta, ankylostomiasis, schistosomiasis, filariasis, yellow fever, spotted fever, trachoma, pemphigus foliaceus and the mycoses. Part III is a critique on the present defects of rural sanitary organization, a discussion of the causes in some detail and suggestions for their amelioration.

It is not possible to give the author's views on each of these matters ; we must limit our remarks to the barest essentials.

The rural population is a shifting and variable one, because people leave the country districts for the towns as urban industrialization develops, but, roughly, of a total population of some 41 million 32·2 per cent. may be regarded as urban or suburban, and 67·8 per cent. as rural ; in round figures, 9 millions live in the towns, 4 millions in the suburbs, and 28 millions in rural areas. These figures are compiled from the returns of 22 States in 1940. From the point of view of race, 84 per cent. are the "European element", but this term

has been widely interpreted, for 51 per cent. are said to be pure whites, 22 per cent. half-castes (from union of whites and negroes), 11 per cent. the offspring of whites and Indians. The remaining 16 per cent. are made up of 14 per cent. negroes and 2 per cent. pure Indians.

There follow brief and rather general remarks on subjects which are taken up again in more detail in Part II, such as Race and Malaria ; negroes are said to be tolerant of *P. vivax* infection, but more susceptible to *P. malariae* and *P. falciparum* ; leishmaniasis which attacks all races equally ; trachoma, much more common among the white races ; yaws, called for reasons not explained Castellani's disease. Figures for this are not given for later than 1935 which showed that whites and half-caste races were most, and nearly equally attacked, 46·5 and 48·5 per cent. respectively, and negroes only 4·6 per cent. These refer to Pernambuco. Altitude and climate and their relation to the same diseases, and similarly with vegetation, are referred to ; incidentally we may note the name *Pian bois*, forest yaws, for espundia or cutaneous leishmaniasis. Climate, as will be obvious in so large a territory, varies much—equatorial, tropical with seasonal rains, semi-arid where eye diseases are common, subtropical, and temperate as in the south. Malaria receives brief notice under each of these. Thus, it will be seen that this introductory chapter covers thinly a wide field. Chapter II, on the economic and social conditions names the chief occupations in the various localities and the food habits of the people. This is followed by a consideration of the connexion between the soil and rural endemic disease and refers to several diseases : the cultivation of *maté*, the Paraguayan tea, and cutaneous leishmaniasis ; the *chicleros* (chicle gum gatherers) and insect-borne diseases among those working in the woods and forests, *Phlebotomus* fever, jungle yellow fever ; cane cultivation and helminthiasis, schistosomiasis and the presence of *Australorbis* ; road construction and malaria. Next comes movement of the people and rural disease ; internal migration owing to drought and transfer of cattle, the discovery of gold, cultivation of coffee, all these tend to disseminate infection. Dwellings and rural endemic disease follow and show how tumble-down shacks give cover to Triatomidae and foster the spread of Chagas's disease, and how store-houses for manioc flour harbour rats whose fleas are likely to spread plague. Food and endemic disease comes next under discussion ; vitamin deficiency and imbalance associated with beriberi, pellagra, hemeralopia and scurvy, *mal de engasgo* ascribed to vitamin B_1 deficiency ; iodine deficiency and goitre and, incidentally, the possible connexions between avitaminosis and malaria infection, hookworm and trachoma.

Chapter VII starts Part II. It is important and covers a wide field and includes demography, densities of population, meteorological data ; family records—housing, water supply, drainage, number of children, illnesses past and present, and a few vital statistics for odd years, too scrappy to be of general service. Individual records are kept of biometry of boys and girls up to 18 years of age, their vital capacity, blood pressure, pulse-rate, etc.

The succeeding 14 chapters deal in greater detail with special diseases, beginning with malaria, its distribution, formulae for estimating morbidity and mortality, epidemic, parasitic and splenic indices ; vectors and their breeding-sites, registration of entomological data ; treatment and prophylaxis, personal and large-scale engineering projects ; leishmaniasis, cutaneous and visceral, its local prevalences in certain years [too arbitrarily chosen to serve much useful purpose at the present time ; for example, in a men's hospital, a women's hospital and a dermatological clinic in São Paulo in 1919] ; a questionary is reproduced for information concerning the endemicity and indices of cutaneous and mucous membrane involvement and a measurement of the *Phlebotomus* prevalence. Treatment and preventive measures are also

mentioned. Chagas's disease naturally has a chapter to itself. Records are given from different States and measurements of endemicity by estimation of the parasitic index, diagnosis by direct blood-examination, by xeno-diagnosis and by animal inoculation, by fixation of complement and the precipitin reaction. Electrocardiography and viscerotomy are considered, and prophylaxis, general and individual. Other diseases discussed are amoebiasis, yaws, pinta, ankylostomiasis, schistosomiasis, filariasis, yellow fever, Rocky Mountain fever, for which a good scheme of inquiry has been organized in São Paulo for diagnosis by observation of suspected cases, collection of ticks in the dwellings and on animals, post mortem material from the heart and the results of liver and spleen puncture ; preventive measures are detailed. Trachoma returns for 6 regions in São Paulo in 1938 are given, showing how much greater is the prevalence in rural than in urban schools. Thus, in Araraguara the percentages were 3·7 in urban, 37·7 in rural schools ; in Aracatuba 5·4 and 46·0 ; in Catanduba 10·7 and 71·0 respectively. The chief foci in Brazil are in Ceará, São Paulo and Rio Grande do Sul. Pemphigus foliaceus, *fogo selvagem* or " wild fire " [see this *Bulletin*, 1946, v. 43, 585 ; 1948, v. 45, 464] whose aetiology is still unknown, and various mycoses end this section of the book.

Part III comprises three chapters. In the first the problem of Organization is stated and in the second the difficulties, the chief being the scattered character of the rural population, economic factors, particularly the low state of living and general ignorance, deficient data on the epidemiology of rural diseases, the scarcity of men with special knowledge of rural districts—malariologists, epidemiologists, dentists, sanitary engineers, nurses, etc. In the final chapter proposals for organization of a rural hygiene service are put forward, to include propaganda, education of adults as well as children in health principles, by example and by precept, cooperation and mutual help in outbreaks, provision of more doctors, health clinics and regional hospitals, maternity and child-welfare departments, health centres to change the habits and customs if they are insanitary, and to inculcate sounder measures and cure disease.

It will be seen from the foregoing account that much of the information in this book is of local interest ; at the same time much that is useful and could be applied in other rural areas can be gathered by careful reading of the work which must be looked upon as a book *sui generis*, almost a pioneer work the composition of which must, as we said at the outset, have entailed much labour.

H. Harold Scott

Levi Castillo, Roberto. **Atlas de los anofelinos Sudamericanos.** [Atlas of South American Anophelines.] 206 pp., 1 map & 354 figs. on 52 pls. 1949. Guayaquil, Ecuador : Tip. de la Sociedad Filantrópica del Guayas.

Professor Buxton, reviewing a paper by Senevet [this *Bulletin*, 1948, v. 45, 1051], has drawn attention to the unsatisfactory state of Anopheline taxonomy in South America. This book does little to improve matters. Many will no doubt wish to use it to supplement the useful keys to larvae and female adults compiled by Russell, Rozeboom and Stone [this *Bulletin*, 1944, v. 41, 325] but they should do so with caution. The author has added keys to eggs and male terminalia and has included certain additional species, most of them described since the publication of the earlier keys. These are :—

Chagasia rozeboomi Causey, Deane & Deane, 1945 and *Anopheles chiriquiensis* Komp, 1936 ; *holmbergi* Del Ponte & Heredia, 1945 ; *dunhami* Causey, 1945 ; *konderi* Galvao & Damasceno, 1942 ; *galvaoi* Causey, Deane & Deane, 1943 ; *laneanus* Correa & Cerqueira, 1944 ; *oiketorakras* Osorno Mesa, 1947 ; *canorii* Floch & Abonnenc, 1945 ; and *costalimai* (Fonseca & Ramos).

The provenance of the last name is not explained. It is a *nomen novum* proposed with a full redescription by COUTINHO (*Mem. Inst. Oswaldo Cruz*, 1943, v. 39, 425) to replace *limai* Fonseca & Ramos [not, as stated by Senevet, *loc. cit.*, by CERQUEIRA to replace *costai* of these authors].

Certain species omitted by Russell, Rozeboom & Stone from their keys as being of doubtful validity are here included. Others included by the earlier authors are omitted. The omission of *A. gambiae* Giles appears ill-advised since, although this species is believed to have been eradicated from South America, it is by no means impossible that it may reappear. *Anopheles marajoara* Galvão & Damasceno (*Folia Clin. Biol.*, S. Paulo, 1942, v. 14, 60) is omitted from both works. The important vector *A. darlingi* Root is omitted from the list of species on p. 66 but appears in the keys. *A. intermedius* Chagas, although included in the other keys, is omitted from the key to female adults. No synonymy is given and there is no explanation of any of these omissions or inclusions. There is no discussion of the important question of subspecific categories although some of these are included in the keys. In addition to the latter there are sections on distribution, zoogeography, bionomics, breeding-places, adult habitations, " biostatistical indices " and generic and sub-generic characters.

The figures, although numerous, are poorly printed and frequently over-reduced. Some of them appear to have been included in error and alternative versions are printed under the heading of " Erratas " on the last page. The very full bibliography is welcome but it is not rendered easier to use by lapses from strict alphabetical sequence, numerous minor errors and the author's use of his own abbreviations in preference to those given by the World List. It does not even agree in all cases with the list of species as regards dates of publication and the order of joint authors' names. *P. F. Mattingly*

WENDER, Leo. **Animal Encyclopaedia. Mammals.** English Edition. Edited by Martin A. C. HINTON, F.R.S. With Latin Index. 266 pp., numerous illustrations. 1948. London : George Allen and Unwin Ltd. [12*s.* 6*d.*]

In a short introduction the editor, Dr. M. A. C. Hinton, states that this book fills a large gap in the popular literature dealing with the subject, that no other volume is so comprehensive, and that layman and scientist will find concentrated in it the most interesting facts concerning the mammals of the world. In a book of this size it was impossible to include every animal, but the omissions are mostly of subspecies or closely related forms.

The animals are described in alphabetical, rather than zoological, order, an arrangement which perhaps makes the book more generally useful. At the end there is a classification of the mammals into orders and families, while in the text itself these divisions are mentioned alphabetically, definitions and distribution being given so that it is simple to ascertain the exact systematic position of any animal. With a minimum of technicalities, and the inclusion of gestation periods and numbers of young, and good English and Latin indexes, the zoological angle is therefore well covered. The description usually includes size, markings, distribution, food, habits and Latin names, and the following quotation illustrates how comprehensive this information can be in a small space :—

" *Fat Dormouse*, the largest of the European Dormice, head and body about 7 in., tail about 5½ in. long ; about two-thirds the size of a red squirrel. Smoky grey above, whitish below. Central and Southern Europe, found in deciduous woods and in parks ; nocturnal. Feed on acorns, beech-nuts, fruit, etc. : also

eggs and young of birds. Hibernate in holes in trees and in the ground. Where numerous can be a pest in orchards. Were regarded as a delicacy by the Romans who fattened them in cages. 3–7 young at a birth. Introduced in recent years to Buckinghamshire, where they are reported to be spreading ; known to local residents as ' Spanish Rats.' *Glis glis.*"

The author does not necessarily confine himself to the bare minimum ; the annotations contain many interesting observations. In a few words is told the tragedy of the Norway Lemmings which swarm in certain years, overrun the lowlands and perish in vast numbers in the fjords and sea beyond. Then no one can fail to be interested in the story of the domestication of the horse from three centres ; one Indo-German or Aryan dating from 3000 B.C. originating perhaps in Southern Russia, the second derived from the Western European wild horse giving rise to draught horses and the third the Mongolian stock. That does not conclude the information about the horse because different breeds, such as Arabs, Barbs, etc., are treated separately in annotations of their own. The animal kingdom possesses so many curious features, that there is a surprise on almost every page of this book : who knows that the sloth derives its protective coloration from the blue and green algae lining the grooves in the hairs, or that the danger signal to a herd of springbok is given by the buck making 10 vertical leaps into the air, with eversion of its dorsal gland ?

There are many examples of animals nearly becoming extinct and which have yet just managed to survive by man's intervention. One of the most interesting is the case of Père David's deer, a peculiar antelope now unknown in the wild state but originally preserved in the summer palace at Peking. The herd was exterminated during the Boxer rising, but by a lucky chance just before this episode some specimens had been sent to Europe and their descendants still survive in the park of Woburn Abbey.

The encyclopaedia is illustrated by not very well produced monochrome pictures. These could be multiplied with advantage and it would be more useful to have drawings of the rarer animals rather than the tiger or the porcupine.

This encyclopaedia might well be called the Baedeker of the Zoo where it would be an ideal companion. Apart from the general features, the text seems to devote an abnormal amount of attention to the fur trade ; there is hardly a page which does not include information about the number of pelts produced annually or the trade names, etc. This seems a little irrelevant, and a medical reader would welcome the substitution of information regarding zoonosis or the animal reservoirs of disease. In only about one instance is this mentioned at present, in the case of plague and rats. The work would have a greater value to medical readers if the disease-reservoir potentialities had been noted for each animal ; but perhaps this is too much to hope for. In the meantime it can be kept on the shelf of the medical worker ready to consult either for verifying a Latin name or for learning a little about the habits of some animal carrier of disease. *P. C. C. Garnham*

Fonseca, F. & Wohlwill, Fr., with the collaboration of M. R. Pinto. **Tifus exantemático**. [Exanthematic Typhus.] 212 pp., 72 figs. (3 coloured on 2 pls.), 2 folding maps & 3 diagrams. Manuales de Medicina Práctica. 1944. Barcelona : Buenos Aires : Salvat Editores, S.A.

This interesting and attractively produced little book was published in 1944 and the latest date of any publication mentioned in the bibliography is 1942. The volume, however, deserves a place in the medical library because of the exceptionally full and clear description of the morbid anatomy of typhus fever ;

this runs to 40 pages, including 18 good illustrations and a bibliography of 56 references. The historical chapter contains a number of interesting pieces of information not likely to be met with in the standard books on typhus fever.

The authors mention that the tick-borne typhus of Portugal, called by the forbidding name *fiébre escaronodular*, cannot be distinguished from exanthematic typhus by biopsy of the exanthem, a method which they recommend for the early diagnosis of the typhus fevers.

Although there is a brief description of murine typhus the only reference to the tick-borne disease is the one mentioned above. *John W. D. Megaw*

DUBOIS, Albert [M.D., Director of the Institute of Tropical Medicine, Antwerp] & VAN DEN BERGHE, Louis [M.D., D.Sc., etc.]. **Diseases of the Warm Climates. Their Clinical Features, Diagnosis and Treatment.** pp. xv+445, 21 charts & 100 figs. 1948. London: William Heinemann—Medical Books Ltd., 99 Great Russell Street, W.C.1. [42*s*.]

This is the promised English version referred to in the review of the book originally published in French [this *Bulletin*, 1949, v. 46, 298].

It is excellently printed and illustrated on art paper and fulfils for English readers all the promises of the original production in French.

The English edition contains a foreword by Dr. Wilbur A. Sawyer.

H. J. O'D. Burke-Gaffney

Printed under the authority of HIS MAJESTY'S STATIONERY OFFICE
by The South Essex Recorders, Ltd., Ilford.

1440) Wt. P20/360 2/50 S.E.R. Ltd. Gp. 432

INDEX OF AUTHORS OR SOURCES

(The bracketed abbreviations after the page numbers indicate the subjects. Page numbers within brackets indicate papers not summarized.)

Am.	signifies	Amoebiasis and Intestinal Protozoal Infections.
Bart.	,,	Bartonellosis.
Bl.	,,	Blackwater Fever.
B.R.	,,	Book Review.
Chl.	,,	Cholera.
Def. Dis.	,,	Deficiency Diseases.
Den.	,,	Dengue and Allied Fevers.
Der.	,,	Dermatology and Fungus Diseases.
Ent.	,,	General Entomology and Insecticides.
Ep. Dropsy	,,	Epidemic Dropsy.
Haem.	,,	Haematology.
Heat Str.	,,	Heat Stroke and Allied Conditions.
Hel.	,,	Helminthiasis.
Lab.	,,	Laboratory Procedures.
Leish.	,,	Leishmaniasis.
Lep.	signifies	Leprosy.
Mal.	,,	Malaria.
Misc. Dis.	,,	Miscellaneous Diseases.
Oph.	,,	Tropical Ophthalmology.
Pl.	,,	Plague.
Prot.	,,	General Protozoology.
Rab.	,,	Rabies.
R.F.	,,	Relapsing Fever and other Spirochaetoses.
Reports, etc.	,,	Reports, Surveys and Miscellaneous Papers.
Sp.	,,	Sprue.
Tryp.	,,	Trypanosomiasis.
Typh.	,,	Fevers of the Typhus Group.
Ulc.	,,	Tropical Ulcer.
Vms.	,,	Venoms and Antivenenes.
Y.F.	,,	Yellow Fever.
Ys.	,,	Yaws.

A

Abalos, J. W., 967 (Vms.)
——, with Romaña, 535 (Tryp.), 569 (Vms.), 583 (Ent.)
Abbott, P. H., 705 (Mal.)
Abbott, R. T., 558 (Hel.)
Abdel Azim, M. & Barlow, C. H., 150 (Hel.)
——, with Watson & Halawani, (380) (Hel.)
Abdel Aziz, A., with Halawani & Ashour, (355) (Y.F.)
Abdou, S. & Grace, H. K., 269 (Hel.)
Abonnenc, E., (582) (Ent.)
——, with Camain, (582) (Ent.)
——, with Caubet, René-Boisneuf & Louis-Sidney, 318 (Mal.)
—— & Chassignet, R., (94) (Ent.)
——, with Floch, (94) *bis*, (582) (Ent.), (924) (Tryp.), (1008) (Mal.)
Acevedo, C. E., with Rodriguez-Molina, Lang, Jiminez-Torres & Diaz, 558 (Hel.)
Acheson, R. M., with King & Spensley, (114) (Mal.)
Acosta-Matienzo, J., with Maldonado, 377 (Hel.)
Ada, G. & Fulton, J. D., 925 (Leish.)
Adams, A. R. D. & Seaton, D. R., 936 (Am.)
Adamson, H., with Browning & Calver, (126) (Tryp.)
Adamson, P. B., 781 (Ulc.)
Adleman, R. J., with Kissin, 519 (Mal.)
Adler, S. & Zuckerman, A., 449 (Leish.)
African Affairs, 178 (Reports, etc.)
Afridi, M. K. & Singh, D., 17 (Mal.)
Afrika, 594 (B.R.)
Afrique Occidentale Française, 416, 1095 (Reports, etc.)
Agostinucci, G., with Biocca & Bronzini, 179 (Reports, etc.)
Agricola, E., 680 (B.R.)
Aguilar Rivas, A., with Zúniga, 6 (Mal.)
Ahmad, M. U., 35 (Pl.)
Ahuja, M. L. & Brooks, A. G., 775, 867 (Vms.)
—— & Gurkirpal Singh, 38 (Chl.)
——, with Shrivastava & Singh, 827 (Chl.)
Aikawa, J. K., with Harrell, 724 (Typh.)
Ainley, A. D., Curd, F. H. S. & Rose, F. L., (522) (Mal.)
—— & Sexton, W. A., (412) (Ent.)
Aizemberg, M., with Borzone & Lapieza Cabral, 1132 (Tryp.)
Akima, T., with Magara, Go & So, 782 (Ulc.)
Akle Delgadillo, J. & Pérez Rebelo, R., 625 (Typh.)
Alain, M., Massal, E., Touzin, R. & Porte, L., 1037 (Am.)
——, Saint-Etienne, J. & Reynes, V., 971 (Misc. Dis.)
Alakija, O. B., 497 (Heat Str.)
Alberto Alvarado, C., (501) (Ent.)
Albornoz Plata, A., 1055 (Hel.)
Albou, with Benhamou & Leonardon, 903 (Mal.)
Alburn, H. E., with Ehrich, Seifter & Begany, 487 (Hel.)
Alderson, S., 265 (Lep.)
Alexa, I., with Ciuca, Duport & Athanasiu, 1115 (Mal.)
Alexio, H. B., with Costa, 149 (Lep.)
Aleixo, J. & Furtado, T. A., 283 (Der.)
Ali Al Hamami, with Watson, 846 (Hel.)
Alicata, J. E. & Burr, G. O., 962 (Hel.)
Allan, W., with Trapnell & Martin, 100 (Reports, etc.)
Allen, R. M., 778 (Der.)

de Almeida, C. L., with Ferreira & Pinto, 1105 (Mal.), 1127 (Tryp.)
de Almeida, J. O., with de Freitas, 1129 (Tryp.)
de Almeida, L., with de Sousa, 1020 (Leish.)
Alston, E. F., with Chang, Smith & Riesenman, 378 (Hel.)
Altmann, A. & Murray, J. F., 159 (Def. Dis.)
Alvarado, C. A. & Coll, H. A., 332 (Mal.)
Alvarez Crespo, J., (376), (386) (Hel.)
Alvarez Lowell, L., Puchol, J. R. & Rodriguez Perez, A. P., 1051 (Lep.)
——, Rodriguez-Perez, A. P., and Puchol, J. R., 46 (Lep.)
Alves, 57 (Hel.)
Alves, W., 947 (Hel.)
Alving, A. S., with Atchley, Yount, Husted, Pullman & Eichelberger, 214 (Mal.)
Amatuzio, D. S., with Hill, 905 (Mal.)
d'Ambra, G. B., 438 (Mal.)
American Association for the Advancement of Science. Section on Medical Sciences, 590 (B.R.)
Americano Freire, S. & Faria, G. S., 212 (Mal.)
Anastopoulos, B., 634 (Am.)
Andersag, H., with Salzer & Timmler (18) (Mal.)
Anderson, H. H., with Hansen, 40 (Am.)
——, Johnstone, H. G., Bostick, W., Peña Chevarría, A. & Packer, H., 1146 (Am.)
d'Andretta, C., Jr. & d'Andretta, M. V., 171 (Ent.)
d'Andretta, M. V., with d'Andretta, 171 (Ent.)
Andreu, R. M., with Arenas, Espinosa & Padrón, 271 (Hel.)
Andrews, J. M., 111 (Mal.), 500 (Ent.)
—— & Gilbertson, W. E., 440 (Mal.)
Anduze, P. J., with Risquez-Iribarren & Cordero Moreno, 1082 (Oph.)
Anfinsen, C. B., with Ball, McKee, Cruz & Geiman, 117 (Mal.)
Angel Ibars, D., 842 (Lep.)
Angioni, G., 832 (Am.)
Angrisani, V., 1087 (Misc. Dis.)
Anigstein, L., with Beninson, 626 (Typh.)
——, with Cross, 92, 1186 (Prot.)
——, Whitney, D. M. & Beninson, J., 725 (Typh.)
—— & ——, with Hansen, N. W., 244 (Typh.)
Ann. Intern. Med. (641) (Lep.)
Ann. New York Acad. Sci., 1161 (Hel.)
Ansari, N. & Minou, A., 170 (Prot.)
d'Antoni, J. S., 1031 (Am.)
Antonipulle, P., with Carter, 974 (Ent.)
Anzola Falcon, T., Gomez Marcano, A. & Lopez, J. A., 12 (Mal.)
Aparicio Garrido, J. (797) (Mal.)
—— & Benitez Calvo, L. A., 435 (Mal.)
Aparisi Jijon, T. (51) (Lep.)
de Aquino, U. M., 1151 (Lep.)
Arai, M., with Tamiya, Hazato, Yamamoto, Iida, Shimojo, Nishioka, Kawamura Suzuki, Tsukamoto & Schoble, 927 (Typh.)
Arakawa, S., with Yaoi, 137 (Den.)
Aramburu, T., with Garcia Lopez, Milanes, Lopez Toca & Spies, 279 (Sp.)
——, with Spies, Garcia Lopez, Milanes & Lopez Toca, 864 (Haem.)
——, with ——, ——, ——, Stone, Lopez Toca & Kartus, 1073 (Haem.)
——, with ——, Stone, Garcia Lopez, Milanes & Lopez Toca, 80, 1167 (Haem.)
——, with ——, Suarez, Garcia Lopez, Milanes, Stone, Lopez Toca & Kartus, 566 (Haem.)
Arana Iñiguez, R., Garcia Capurro, R. & Caubarrere, N. L. (382) (Hel.)
Arbona, G., with Pomales Lebron, Morales Ottero & Koppisch, 132 (Typh.)
Archivos Sec. Salud Publica de la Nación, Buenos Aires, 1160 (Hel.)
Ardao, R., with Bonnecarrere (1161) (Hel.)
Ardoin, R., with Sautet, Levavasseur & Vuillet, 976 (Ent.)
Arenas, J. V., with Benaim Pinto, 279 (Sp.)
Arenas, R., Espinosa, A., Padrón, E. & Andreu, R. M., 271 (Hel.)
Arguelles Casals, D., 91 (Misc. Dis.)
Armbrust, A. de F., 1060 (Hel.)
Armstrong, T. G., Elsdon-Dew, R. & Marot, R. J., 831 (Am.)
——, Pooler, N. R. & Elsdon-Dew, R., 259 (Am.)
——, Wilmot, A. J. & Elsdon-Dew, R., 831 (Am.)
Armstrong, W., 1034 (Am.)
Arnaud-Battandier, R., with Sarrouy & Cabannes, 924 (Leish.)
Arnold, H. L., Jr., 478 (Lep.)
Arnoult, H., with Ceccaldi, Trinquier & Pellissier, 967 (Vms.)
Arráiz, A. (100) (Reports, etc.)
de Arruda, W., da Costa, F. C., Nahas, S. & Rosenfeld G., 816 (Leish.)
Asenjo, C. F., Freire de Guzmán, A. R., Mayoral de Asenjo, A. G. & de Lopez Candal, J. G., 447 (Mal.)
Ashbel, R., 471 (R.F.)
—— & Poljakoff, A., (375) (Lep.)
Ashburn, L. L., with Emmons, 495 (Der.)
—— & others, 1161 (Hel.)
Ashkar, (379) (Hel.)
Ashour, M., with Halawani & Abdel Aziz, (355) (Y.F.)
Ashworth, R. de B., Crowther, A. F., Curd, F. H. S., Hendry, J. A., Richardson, D. N. & Rose, F. L., (611) (Mal.)
Asquith, R. S., Hammick, D. L. & Williams, P. L., (15) (Mal.)
Atchley, J. A., Yount, E. H., Husted, J. R., Pullman, T. N., Alving, A. S. & Eichelberger, L., 214 (Mal.)
Atencio M., H., with Ottolina, 759 (Hel.)
Athanasiu, M., with Ciuca, Alexa & Duport, 1115 (Mal.)
Athias, Timsit, R. & Zermati, (622) (Leish.)
Aubry, Laffargue & Portier (434) (Mal.)
Audoye & Dessausse, (153) (Hel.)
Audy, J. R., 247, 724 (Typh.)
Auerbach, S. H. & Buchholz, R. R., 450 (Leish.)

Auffret, C., with Jonchere & Raoult, 528 (Bl.)
——, with Raoult, Tanguy & Martin, 913 (Bl.)
—— & Tanguy, F., 964 *bis* (Def. Dis.)
Augustine, D. L., with Gordon, 572 (Misc. Dis.)
Aujoulat, L., 990 (B.R.)
Austin, C. J., 638 (Lep.)
Austoni, M. & Bovo, G., 1148 (Am.)
Autheman, R., with Brisou & Castet, 523 (Mal.)
Ayyad, N., with Azim, 646 (Hel.)
Ayyar, S. R., 784 (Misc. Dis.)
Ayub, V., & Pérez, J., (256) (Pl.)
de Azevedo, J. F., with da Fonseca, 62 (Hel.)
—— , Roque, R. de A., Colaço, A., Cristino, E., Rés, J. F. & Coelho, M. F., 1062 (Hel.)
——, da Silva, J. B., Coito, A. de M., Coelho, M. F. & Colaço, A., 1056 (Hel.)
Azim, M. A., & Ayyad, N., 646 (Hel.)
—— & Watson, J. M., 946 (Hel.)
——, with ——, 948 (Hel.)
Aziz, M., 16 (Mal.)
——, with Shelley, 807 (Mal.)

B

Bablet, J., with Deschiens, 65 (Hel.)
Babudieri, B. & Bocciarelli, D., 835 (R.F.)
Bach, L. G., with Foy, Kondi, Damkas, Depanian, Lefcopoulou, Dax, Pitchford, Shiele & Langton, 316 (Mal.)
Bacigalupo, J., 334 (Mal.)
Baer, J. G., with Joyeux, 951 (Hel.)
——, Kouri, P. & Sotolongo, F., 952 (Hel.)
Bahmanyar, M., with Baltazard, 25 (Typh.)
——, with —— & Mofidi, 43, 44 (R.F.)
——, with ——, Seydian & Mofidi, 836 (R.F.)
Bailenger, J., with Pautrizel, 653 (Hel.)
Bailey, C. A., Diercks, F. H. & Proffit, J. E., 348 (Typh.)
Bailly, J., with Remlinger, 356 (Rab.)
Baker, R. H., with Downs, 673 (Ent.)
Balasubrahmanyan, M., with Gault, 484 (Hel.)
Baldi, A. & Del Giudice, V., 434 (Mal.)
Baldwin, E., and Moyle, V. (854) (Hel.)
Baliff, L., *see* Ballif, L.
Ball, E. G., McKee, R. W., Anfinsen, C. B., Cruz W. O. & Geiman, Q.M., 117 (Mal.)
Ball, G. H., 18 (Mal.)
Ballif, L., with Ciuca, Chelaresco, Constantinesco & Timisescu, 321, 329 (Mal.)
——, with ——, ——, Vrabie & Munteanu-Vasiliu 322 (Mal.)
Balozet, L., 42 (R.F.)
Baltazard, M. & Bahmanyar, M., 25 (Typh.)
——, ——, & Mofidi, C., 43 (R.F.)
——, Mofidi, S. & Bahmanyar, M., 44 (R.F.)
——, Seydian, B., Mofidi, C. & Bahmanyar, M., 836 (R.F.)
Balteanu, I., Constantinesco, N. & Toma, A., (1140) (Rab.)
——, Russ, M. & Voiculescu, M., 837 (R.F.)
——, Voiculescu, M. & Russ, M., 837 (R.F.)
Balzar, M., 427 (Mal.)
Bami, H. L. (115) (Mal.)
—— & Guha, P. C. (806) *bis* (Mal.)
——, Iyer, B. H. & Guha, P. C. (114) *ter*, (115) (Mal.)
Bang, F. B., with Papirmeister, 55 (Hel.)
Barakat, M. R. & Smith, D. A., 962 (Def. Dis.)
Baranger, P. & Filer, M. K., 446 (Mal.)
Barber, C. H., 1190 (Reports, etc.)
Barboza, A. (413) (Lab.)
Baribeau, B. J., with Kahn & Villalon, 944 (Lep.)
Barksdale, W. L. & Routh, C. F., 261 (Am.)
Barlovatz, A., 459 (Den.)
Barlow, C. H., 752 (946) (Hel.)
——, with Abdel Azim, 150 (Hel.)
——, & Meleney, H. E. 553 (Hel.)
Barnes, A. C., 129 (Typh.)
Barnes, G. T., 392 (Haem.)
Barrett, R. H., 1091 (Reports, etc.)
Barrientos, E., with Reyes, Rodriguez, Carranza Amaya & Peralta, 639 (Lep.)
de Barros, L. C., 1130 (Tryp.)
Barsky, S., with Cornbleet & Schorr, 865 (Haem.)
Bartgis, I. L., with Reardon, 828 (Am.)
Basnuevo, J. G., 388 (Hel.)
—— & Gutiérrez Estarlí, E., 1036 (Am.)
Bass, H. E., Schomer, A. & Berke, R., 780, 968 (Der.)
Bassères, M. S., with da Costa, 330 (Mal.)
Bassi, G., 657 (Def. Dis.)
Bates, M. & de Zulueta, J., 698 (Mal.)
——, with ——, 517 (Mal.)
Batson, H. C., with Gauld, Schlingman, Jackson, Manning & Campbell, 826 (Chl.)
Battelli, C., 1161 (Hel.)
Battersby, A. R. & Openshaw, H. T. (940) *bis* (Am.)
Bauer, J. L., with Berk & Castle, 165 (Haem.)
Baum, F. L., 1176 (Oph.)
Bauman, P. M., Bennett, H. J. & Ingalls, J. W., Jr., 270 (Hel.)
——, with Ingalls, Hunter & McMullen, 950 (Hel.)
Baumann, H., with Schwetz & Fort, 897 (Mal.)
Bayles, A., with Thompson, Bush & Lilligren, 446 (Mal.)
Baylis, H. A., 952 (Hel.)
Baz, I., with Halawani, Hafez & Shawarbi, 650 (Hel.)
——, with —— & Morcos, 435 (Mal.)
Beach, E. W., 155 (Hel.)
Beament, J. W. L., with Lees (94) (Ent.)
Bean, W. B., Vilter, R. W. & Blankenhorn, M. A., 1072 (Def. Dis.)
——, with —— & Mueller, 658 (Def. Dis.)
Beard, R. R., with Smith & Saito, 495 (Der.)
——, with ——, ——, Rosenberger & Whiting, 1172 (Der.)
Beaudiment, R., Brochen, L. & Peuziat, Y., 918 (Tryp.)
Beaver, P. C., 953 (Hel.)
—— & Deschamps, G., 829, 830 (Am.)
Bechelli, L. M. & Rotberg, A., 370 (372) *bis*, 1149 (Lep.)
——, with ——, 371 (372) *bis* (Lep.), 678 (B.R.)
——, —— & Maurano, F., 678 (B.R.)
——, with de Souza Campos, 681, 682 (B.R.)
——, with —— & Rotberg, 678 (B.R.)

Beck, M. D., Bell, J. A., Shaw, E. W. & Huebner, R. J., 454 (Typh.)
——, with Huebner & Jellison (626) (Typh.)
——, with ——, —— & Wilcox, 823 (Typh.)
——, with Jellison, Huebner, Parker & Bell, 455 (Typh.)
——, with ——, Ormsbee, Huebner, Parker & Bell, 353 (Typh.)
Becker, B. J. P., with Lewin & Horwitz, 255 (Pl.)
Bedarkar, M. K., with Wagle, 358 (Pl.)
Bedford, P. D., 601 (Mal.)
Beemer, A. M., Samuel, E. & Shedrow, A., 146 (Am.)
Beet, E. A., 400, 1182 (Misc. Dis.)
Begany, A. J., with Ehrich, Seifter & Alburn, 487 (Hel.)
Béguet, M., with Sergent, Parrot & Horrenberger, 718 (Typh.)
Bell, E. J., with Jellison, Huebner, Beck & Parker, 455 (Typh.)
——, with ——, ——, Parker & Welsh, 252 (Typh.)
——, with ——, Ormsbee, Beck, Huebner & Parker, 353 (Typh.)
——, with Parker & Lackman, 135 (Typh.)
——, —— & Stoenner, H. G., (726) (Typh.)
——, with —— & ——, (541) (Typh.)
Bell, J. A., with Beck, Shaw & Huebner, 454 (Typh.)
Bell, J. F., with Habel & Wright, 733 (Rab.)
——, Wright, J. T. & Habel, K., 733 (Rab.)
——, with —— & ——, 732 (Rab.)
Beltrán, E. & Nieto C., V. X., 806 (Mal.)
Benaim Pinto, H. & Arenas, J. V., 279 (Sp.)
Benchimol, A. S., (561) (Hel.)
Benedict, C. D., with Weinbaum & Riblet, (872) (Misc. Dis.)
Benhamou, E., Albou & Leonardon, 903 (Mal.)
Beninson, J. & Anigstein, L., 626 (Typh.)
——, with —— & Whitney, 725 (Typh.)
Benitez Calvo, L. A., (699) (Mal.)
——, with Aparicio Garrido, 435 (Mal.)
Benitez-Gautier, C., with Suarez, Perez-Santiago, Rodriguez-Molina & Torregrosa, 391 (Sp.)
Bennet, J., 768 (Def. Dis.)
Bennett, G. M., Crofts, P. C. & Hey, D. H., (522) (Mal.)
Bennett, H. J., with Bauman & Ingalls, 270 (Hel.)
——, with Newton & Figgat, 851 (Hel.)
Bennie, I., 555 (Hel.)
Bennison, B. E. & Coatney, G. R., 220 (Mal.)
Benson, E. S. with Firestone, 870 (Der.)
Bequaert, J., 582 (Ent.)
Béquignon, J. R. & Vialat, C., (140), 736 (Rab.)
Bequignon, R., with Bussard & Lamy, 1141 (Rab.)
——, —— & Vialat, C., 728 (Rab.)
——, Lamy, R. & ——, 728 (Rab.)
Beraldo, W. T., with Rocha e Silva & Rosenfeld, 866 (Vms.)
Berberian, D. A. & Dennis, E. W., 707 (Mal.)
Bercovitz, Z. T., with Clark & Jones, 144 (Am.)
Berg, S. S. & Newbery, G., (706) (Mal.)
Bergeret, C., 66 (Hel.)
——, with Clerc, 365 (Am.)
Berk, L., Bauer, J. L. & Castle, W. B., 165 (Haem.)
Berke, R., with Bass & Schomer, 780, 968 (Der.)
Berman, R. L., with Friedheim & Vogel, 918 (Tryp.)
Bernard, L., Dounet, G. & Jaujou, 736 (Pl.)
Bernfeld, M., with Zaharia, 539 (Typh.)
Bernier, G., with Crosnier, Molinier, Besseige & Lefebvre, 743 (Am.)
Berre, L., 401 (Misc. Dis.)
Berry, W. T. C., 1179 (Ulc.)
——, with Parry & Trowell, 179 (Reports, etc.)
Berti, A. L. & Montesinos, M., 211 (Mal.)
Bertin, V., with Noé, Gutierrez & Neghme, 1008 (Mal.)
Bertozzi, P., with Marill & Hofman, 1153 (Hel.)
Bertram, D. S., with Kershaw, 69 (Hel.)
——, with —— & Williamson, 488 (Hel.)
Bertrand-Fontaine, Fauvert, R. & Schneider, J., 362 (Am.)
Besseige, H., with Crosnier, Bernier, Molinier & Lefebvre, 743 (Am.)
Best, A. E. & Wu, D. C., 648 (Hel.)
Bezerra, F., Jr., with Penido, de Sousa & Pinto, 332 (Mal.)
Bezarra, F. P. G., Jr., with Penido & de Sousa, 610 (Mal.)
Bhagwat, S. Y., 545 (Pl.)
Bhaskaran, K., (924) (Leish.)
Bhatt, H. R., with Viswanathan, 126 (Tryp.)
Bhattacharyya, J., (1089) (Ent.)
——, Dutt, A. K., Bhowmik, H. & Ray, S. N., (1089) (Ent.)
Bhende, Y. M., with Patel, 864, (966) (Haem.)
Bhowmik, H., with Bhattacharyya, Dutt & Ray, (1089) (Ent.)
Biaggi, N. & Pirrazi R., 647 (Hel.)
Bie, K., (661) (Sp.)
Bieling, R. & Oelrichs, L., 1022 (Typh.)
Bier, O. G., 82 (Vms.)
Biggs, R. & Macmillan, R. L., 489, 490 (Haem.)
Biguet, J., with Coutelen & Cochet, (146) *ter*, (549), 637, 941 (Am.), 571 (Der), 951 (Hel.)
Bijlmer, J. & Kraan, H., 317 (Mal.)
Bilhan, N., (21) (Leish.)
Binaghi, G., 700 (Mal.)
Bincer, W., 999 (Mal.)
Binkhorst, C. D., 595 (B.R.)
Biocca, E., 972 (Prot.)
——, Agostinucci, G. & Bronzini, E., 179 (Reports, etc.)
Birks, P. H., 81 (Haem.)
Birtwell, S., Curd, F. H. S., Hendry, J. A. & Rose, F. L., (216) (Mal.)
Bishop, A. & McConnachie, E. W., 119 (Mal.)
Bishop, F. W., Suhrland, L. G. & Carpenter, C. M., 476 (Lep.)
Bishopp, F. C., (583) (Ent.)
Black, B. K., with Jones & Wetzel, (280) (Haem.)
Black, R. H., 95 (Lab.), 1110 (Mal.)
Blackburn, C. R. B., 803 (Mal.)
Blagg, W., with Dawson, 143 (Chl.)

Blair, D. M., with Goodliffe, 55 (Hel.)
——, Hawking, F., Meeser, C. V. & Ross, W. F., 848 (Hel.)
——, Loveridge, F. G., Meeser, C. V. & Ross, W. F., 556 (Hel.)
——, with Meeser & Ross, 1153 (Hel.)
—— & Bruneau, J., 822 (Typh.)
—— & Hintermann, J., (875) (Prot.)
Blanc, G., 461 (Pl.)
—— & Maurice, A., 836 (R.F.)
Blanchon, P., with Turiaf & Cabail, 1183 (Misc. Dis.)
Blanco, F. L. & Fite, G. L., 943 (Lep.)
Blankenhorn, M. A., with Bean & Vilter, 1072 (Def. Dis.)
Blanton, F. S., with Travis, Gjullin, Smith & Wilson, (1088) (Ent.)
Blas Ruiz, H., Gruhn, E. & Schouten, G., 362 (Am.)
Bliznick, A., with Brackett, 751 (Hel.)
Bloch, E. H., with Knisely, Eliot & Warner, 12 (Mal.)
Bocciarelli, with Babudieri, 835 (R.F.)
Bock, M. & Kikuth, W., 540 (Typh.)
de Boer, E., 139 (Rab.)
Bohart, R. M., 412, 581 *bis* (Ent.)
Boiron, H., 1046, 1047 *bis*, 1048 (R.F.)
Boivin, 1181 (Ulc.)
Bondi, A., Jr., with Janton & Sigel, 455 (Typh.)
Bongiardo, A., with Previtera, 128 (Leish.)
Bonilla Naar, A. & Gómez Vargas, M., 642 (Hel.)
Bonne, C., Bras, G. & Lie Kian Joe, 63 (Hel.)
——, with Faust, 59 (Hel.)
Bonnecarrere, E. A. & Ardao, R., (1161) (Hel.)
Bonnin, H. & Moretti, G. F., (771) (Sp.)
von Bonsdorff, B., 154 (Hel.)
Bonsib, R. S., (1076) (Vms.)
Boquet, P. & Lehoult, Y., 393 (Vms.)
Borrotchin, M., with Pellegrino, 620 (Tryp.)
Borzone, R. A., (714) (Tryp.)
——, Lapieza Cabral, P. & Aizemberg, M., 1132 (Tryp.)
Boscardi, F. & Corsi, C., 513 (Mal.)
Bose, H. N. & Chakraborty, D. C., 827 (Chl.)
Bose, P. N., with Krishnan, Smith, Neogy, Roy & Ghosh, 719, 721 *ter* (Typh.)
Bostick, W., with Anderson, Johnstone, Peña Chevarría & Packer, 1146 (Am.)
Botez, V., with Combiesco, Dumitresco, Sturdza, Ciurea & Zarnea, 931 (Typh.)
——, with ——, ——, ——, Popesco, Panaitesco & Zilisteano, 929 (Typh.)
——, with ——, ——, —— & Zarnea, 931 (Typh.)
Bouchet, with Bruzat, (336) (Bl.)
Bovarnick, M. R. & Snyder, J. C., 927 (Typh.)
Boventer, K., 799, 1002 (Mal.)
Bovo, G., with Austoni, 1148 (Am.)
Bower, A. G., 932 (Typh.)
Boycott, J. A., 765 (Hel.)
Boyd, B. L., with Greenberg & Josephson, 119 (Mal.)
Boyd, J. S. K., 235 (Tryp.)
Boyd, M. F. & Coelho, R. D., 804 (Mal.)
Bozzo, A. & Canu, G., 340 (Leish.)
Brackett, S. & Bliznick, A., 751 (Hel.)
Brancone, L. M., with Hewitt, Gumble, Kushner, Safir & Subbarow, 1128 (Tryp.)
Branham, S. E., with Stitt, Clough & contributors, 185 (B.R.)
Brannon, M. J. C. & Faust, E. C., 955 (Hel.)
Bras, G., with Bonne & Lie Kian Joe, 63 (Hel.)
——, Rijkebüsch, L., Kotter, G. F. & Ham, D. L., (869) (Der.)
Braun-Blanquet, M., 954 (Hel.)
de Brauwere, P., 785 (Reports, etc.), 913 (Tryp.)
Breed, R. S., Murray, E. G. D. & Hitchens, A. P., 188 (B.R.)
Breindl, V. & Komárek, J., 800 (Mal.)
Brennan, J. M., (410) (Ent.)
Briceño-Iragorry, L., 718 (Typh.)
Briceño Rossi, A. L., 494 (Der.)
Briney, A. K., with Taylor, 1080 (Der.)
Brinkmann, E., (340) (Leish.)
Brisou, (583) (Ent.)
——, Castet, A. & Autheman, R., 523 (Mal.)
British Commonwealth Collection of Micro-Organisms, 981 (Reports, etc.)
British Med. J., 327 (Mal.), 920 (Tryp.)
Briz de Negroni, C., with Negroni, 1175 (Der.)
——, with —— & Daglio, 167, 1175 (Der.)
Brochen, L., with Beaudiment & Peuziat, 918 (Tryp.)
Bronzini, E., with Biocca & Agostinucci, 179 (Reports, etc.)
Brooke, M. M., Donaldson, A. W. & Mitchell, R. B., 1071 (Hel.)
Brookman, B., with Reeves & Hammon, 173 (Ent.)
Brooks, A. G., with Ahuja, 775, 867 (Vms.)
Brooks, T. J., Jr., Ward, J. W. & Holder, T. M., 488 (Hel.)
Broughton, N., Ogilvie, A. C. F. & Wylie, W. D., 939 (Am.)
Brounst, G., 1109 (Mal.)
——, with Gallut, 935 (Chl.)
——, & Maroun, T., 933 (Chl.)
Brown, D. C., Knight, L. A. & Jellison, W. L., 352 (Typh.)
Brown, H. E., with Derrick, 930 (Typh.)
Brown, H. W., with Thetford, Otto & Maren, 68 (Hel.)
—— & Williams, R. W., 1066 (Hel.)
Brown, J. H., 142 (Pl.)
Brown, M., Cronk, B., de Sinner, F., Green, J. E., Gibbons, J. E. & Kuitunen-Ekbaum, E., (488) (Hel.)
——, Sinclair, R. G., Cronk, L. B. & Clark, G. C., with Kuitunen-Ekbaum, E., 376 (Hel.)
Browning, C. H., Calver, K. M. & Adamson, H., (126) (Tryp.)
Browning, H. C., Fraser, F. C., Shapiro, S. K., Glickman, I. & Dubrûle, M., (410) (Ent.)
—— & Kalra, S. L. 722 (Typh.)
——, Shapiro, S. K. & Dubrûle, M., (410) (Ent.)
Bruckner, S. & Lăzărescu, M., 903 (Mal.)
Brumpt, E., 385 (Hel.)
Brumpt, L. C., 999 (Mal.), (1068) (Hel.)
Brun-Buisson, P., 238 (Tryp.)
——, Diallo, J., Piriou, L. & Caille, J., 123 (Tryp.)
Bruneau, J., with Blanc, 822 (Typh.)
Bruzat & Bouchet, (336) (Bl.)
Bryer, M. S., with Ross, Schoenbach, Burke, Rice & Washington, 350 (Typh.)

Brygoo, E., 1066 (Hel.)
Buchanan, J. C. R., 886 (B.R.)
Büchner, W., (81) *bis* (Vms.)
Buchholz, R. R., with Auerbach, 450 (Leish.)
Buckley, J. J. C., 854 (Hel.)
Buckner, A. J., with Fay & Simmons, 583 (Ent.)
Budiansky, E., 1150 (Lep.)
Bueding, E., 763 (Hel.)
——, with Oliver-González, 489 (Hel.)
——, with Peters, Valk, Higashi & Welch, 763 (Hel.)
Bugher, J. C. & Taylor, M., 1186 (Ent.)
Bukantz, S. C., with Rein, Kent, Cooper, Ruhe & Coatney, 1107 (Mal.)
Bull. Inst. Hyg. Maroc, 1008 (Mal.), 1096, 1097 (Reports, etc.)
Buonomini, G., Sicca, G. T. & Manfredi, M., 315 (Mal.)
de Burca, B. & Forshaw, H. W., 11 (Mal.)
—— & Jacob, V. P., 11 (Mal.)
Burch, T. A., 855 (Hel.)
Burgess, R. C., 278 (Def. Dis.)
Burgess, R. W., 318 (Mal.)
——, with Young & Eyles, 322 (Mal.)
——, with Cooper, Ruhe, Coatney, Josephson & Young, 1007 (Mal.)
Burke, F. G., with Ross, Schoenbach, Bryer, Rice & Washington, 350 (Typh.)
Burkhart, R. L., with Jervis & Koprowski, 1142 (Rab.)
Burn, J. H. & Vane, J. R., 326 (Mal.)
Burnett, D., Jr., with Smith, 95, 1187 (Ent.)
Burr, G. O., with Alicata, 962 (Hel.)
Bush, D. L., 120 (Mal.)
——, with Thompson, Bayles & Lilligren, 446 (Mal.)
Bussard, A., Bequignon, R. & Lamy, R., 1141 (Rab.)
——, with —— & Vialat, 728 (Rab.)
de Bustamante, F. M., Ferreira, M. O. & Rachou, R. G., 1120 (Mal.)
——, with —— & ——, 1120 (Mal.)
Bustamante, M. E., 127 (Leish.)
Bustos Castellanos, J., Cerdán Murrieta, L., Lassman, G. & Ortiz, C., 898 (Mal.)
Busvine, J. R., with Parr, 411 (Ent.)
Buttner, A., 1089 (Ent.)
Butts, D. C. A., 562 (Hel.)
——, with Pacheco, Urcuyo, González, Jiménez & Hernán Páez, 435 (Mal.)
Buxton, P. A., 31 (Pl.), 231, 1128 (Tryp.)
Bylmer, J., 834 (Am.)

C

Cabail, J. L., with Turiaf & Blanchon, 1183 (Misc. Dis.)
Cabannes, R., with Sarrouy & Arnaud-Battandier, 924 (Leish.)
Cabrera, D. J., with Smith & Dy, 612 (Mal.)
Cacciapuoti, R., 63 (Hel.)
Caille, J., with Brun-Buisson, Diallo & Piriou, 123 (Tryp.)
de Caires, P. F., with Micks & Franco, 335 (Mal.)
Cairo: Ministry of Public Health, 150 (Hel.)
Calder, E., with Ferguson, 77 (Sp.)
Calderón, C., with Ortiz Mariotte, 351 (Typh.)
Calderón Rodríguez, J., (480), 1056 (Hel.)
Calero, C., 91 (Misc. Dis.)
California Mosquito Control Association, 290 (Ent.)
Callender, S. T. E., Nickel, J. F., Moore, C. V. & Powell, E. O., 773 (Haem.)
Callot, J., 696 (Mal.)
Calver, K. M., with Browning & Adamson, (126) (Tryp.)
Calvo Fonseca, R., (380) (Hel.)
Camain, R. & Abonnenc, E., (582) (Ent.)
——, with Floch, (66), 853 (Hel.), (148), 477, 479, 746, 748 *bis* (Lep.)
Cambies, 1045 (Am.)
Cambournac, F. J. C., (1007) (Mal.)
Caminopetros, J. P., 28, (29) (Typh.)
Camp, E., with Hopkins, Hillegas, Ledin & Rebell, 282 (Der.)
Campbell, C. C., with Gauld, Schlingman, Jackson, Manning & Batson, 826 (Chl.)
—— & Saslaw, S., 869 (Der.)
——, with ——, 83, 779, 870 (Der.)
—— & ——, with Knibb, S. A., 396 (Der.)
Campos, J. A., 926 (Leish.)
Canaperia, G. A. & Patrissi, T., 109 (Mal.)
Cancela Freijo, J., (869) (Der.)
Canet, J., 328, 521, 705 (Mal.)
Cangelosi, G., 342 (Leish.)
Canizares, O., 840 (Lep.)
Cantrell, W., Kelsey, F. E. & Geiling, E. M. K., 911 (Mal.)
Canu, G., with Bozzo, 340 (Leish.)
Caplan, J. P., 652 (Hel.)
Capponi, M., with Delbove, 206, 513 (Mal.)
Capurro, E. T. & Guillot, C. F., 640 (Lep.)
——, with ——, 1053 (Lep.)
Carayon, A., 528 (Bl.)
Carboni, E. A., with Fernandez, Tommasino & Giminez, 480 (Lep.)
Carini, A. & Reichenow, E., 833 (Am.)
Carlos Radice, J. & Negroni, P., 571 (Der.)
Carmichael, J., 235 (Tryp.)
Carpenter, C. M., with Bishop & Suhrland, 476 (Lep.)
Carranza Amaya, A., with Reyes, Barrientos, Ridriguez & Peralta, 639 (Lep.)
Carrasco, E. O., with Salcedo, Jose & Valenzuela, 390 (Def. Dis.)
Carrera, G. M. & Changus, G. W., 144 (Am.)
Carrere, L. & Moustardier, G., 538 (Typh.)
Carrière, M., with Favarel & Chartres, (255) (Pl.)
Carrillo, E. G., 1084 (Misc. Dis.)
Carter, H. F., 486 (Hel.)
—— & Antonipulle, P., 974 (Ent.)
Carter, J. R., 766 (Hel.)
Caruana, M., with Schneider, 521 (Mal.)
Caselitz, F. H., with Lippelt, 1026 (Typh.)
Cass, E. E., 1178 (Oph.)
Castañe Decoud, A., 1051 (Lep.)
Castellani, A., 397 (Ulc.)
Castellanos, J. V., with Luttermoser, 755 (Hel.)
Castet, A., with Brisou & Autheman, 523 (Mal.)
Castillo Sologuren, F., with Freeman & Espinosa, 537 (Typh.)

Castle, W. B., with Berk & Bauer, 165 (Haem.)
——, with Daland, 492 (Haem.)
——, with Shen & Fleming, 1074 (Haem.)
de Castro, J. C. R., 370 (Lep.)
Castro Cerqueira, G. de, with Souza Lima, 372 (Lep.)
Castro Jenkins, A., (153) (Hel.)
——, with Peña Chavarria, Ovares Arias, Romero López & Fallas Diaz, 342 (Leish.)
Cattan, R., Frumusan, P. & Cousin, R., 486 (Hel.)
Caubarrere, N. L., with Arana Iñiguez & Garcia Capurro, (382) (Hel.)
Caubet, P., Abonnenc, E., René-Boisneuf, P. & Louis-Sidney, 318 (Mal.)
Caughey, J. E., 932 (Typh.)
Causey, O. R., with Deane & Deane, 319 (Mal.)
Cavalade, C. N. G., (1166) (Def. Dis.)
Cawley, E. P., 1079 (Der.)
Cawston, F. G., 59, 647 (Hel.)
Ceccaldi, J., Trinquier, E., Arnoult, H. & Pellissier, A., 967 (Vms.)
Celis, H., with Gahan & Downs, 1119 (Mal.)
Celis Pérez, A., with Potenza, 284 (Der.)
Cendan Alfonzo, J. E., (485) (Hel.)
Cerabona, M., 519 (Mal.)
Cerdán Murrieta, L., with Bustos Castellanos, Lassman & Ortiz, 898 (Mal.)
Chadwick, L. E. & Dethier, V. G., 404 (Ent.)
——, with ——, 404 (Ent.)
Chaffee, E. F., with Larsh, 469 (Am.)
Chakrabarty, R., (561) (Hel.)
Chakraborty, D. C., with Bose, 827 (Chl.)
Chakravarti, H., with Chaudhuri, 325 (Mal.), 718 (Typh.)
Chakravarty, N. K., with Chaudhuri & Rai Chaudhuri, 610 (Mal.)
Chalmers, T. C., Jr. (212) (Mal.)
Chan, E., 658 (Oph.)
Chance, M. R. A. & Dirnhuber, P., (486) (Hel.)
——, & Mansour, T. E., 760 (Hel.)
Chand, A., Gupta, D. C. & Chhuttani, P. N., 126 (Leish.)
Chang, A., with Chung, Lim, Wang & Koeh, 434 (Mal.)
Chang, F. C., with Fieser, Dauben, Heidelberger, Heymann & Seligman, (115) (Mal.)
Chang, H., with Ke & Liu, 26 (Typh.)
——, with Liu & Wang, 24 (452) (Typh.)
Chang, K., Tong, W. H., Chin, H. T. & Li, C. H. (466) (Am.)
Chang, N. C., 716 (Typh.)
——, with Zia, 346 (Typh.)
Chang, S. L., 1031 (Am.)
Chang, T. -H., Smith, G. W., Riesenman, F. R. & Alston, E. F., 378 (Hel.)
Chang Chiang E., with Kuo Shao Chou & Yui Huan Wen, 647 (Hel.)
Changus, G. W., with Carrera, 144 (Am.)
Chao, H., with Yi, Chow & Liu, 489 (Def. Dis.)
Chartres, A., with Favarel & Carrière, (255) (Pl.)
Chassignet, R., with Abonnenc, (94) (Ent.)
——, with Floch, (94) (Ent.)
Chatterjee, J. R., with Gupta, (815) (Leish.)
Chatterjee, S. N., 553 (Lep.)
—— & Dharmendra, 668 (Oph.)
Chaudhuri, R. N. & Chakravarti, H., 325 (Mal.) 718 (Typh.)
——, Rai Chaudhuri, M. N. & Chakravarty, N. K., 610 (Mal.)
Chaussinand, R., (147), (369), 1052 (Lep.)
——, Paris, C. & Crougue, O., 372, 375 (Lep.)
Chelaresco M., with Ciuca, Ballif, Constantinesco & Timisescu, 321 (Mal.)
——, with ——, ——, Timisescu, Vasiliu-Munteanu & Trofin, 329 (Mal.)
——, with ——, Ballif, Vrabie & Munteanu-Vasiliu, 322 (Mal.)
Chen, H. H., with Sprent, (854) (Hel.)
Chen, H. T., 1070 (Hel.)
Chen, K. K., with Henderson, Rose & Harris 614 (Mal.)
Chen, T. H., 358, 1143 (Pl.)
Chen-Jen, C. & Zia, S. H., 140 (Rab.)
Chesterman, C. C., 57 (Hel.) 768 (Def. Dis.)
Chevez Zamora, A., with Latapi, 1053 (Lep.)
Chevrot, L., with Raynaud & Miniconi, 902 *bis* (Mal.)
Chhuttani, P. N., 771 (Haem.)
——, with Chand & Gupta, 126 (Leish.)
——, with Taylor & Kumar, 771 (Haem.)
Chi, H., 668 (Oph.)
Chin, H. T., with Chang, Tong & Li, (466) (Am.)
Chiyuto, S., (480) *bis* (Lep.)
Choa, G. H., with Kiang, 746 (Lep.)
Chopra, B. L., (877) (Ent.)
Chou, T. C. & Jang, C. S., 366 (Am.)
Choussat, H., with Lebon & Choussat-Clausse (520) (Mal.)
Choussat-Clausse, J., with Lebon & Choussat (520) (Mal.)
Chover Madramany, P., 844 (Lep.)
Chow, H., with Chung & Lu, 341 (Leish.)
Chow, Y., with Yi, Chao & Liu, 489 (Def. Dis.)
Christensen, W. R., 85 (Heat Str.)
Christoffersen, N. R. & Heintzelmann, F. (77) (Sp.)
Chung, H., Lim, K. T., Chang, A., Wang, W. P. & Koeh, Z. S., 434 (Mal.)
Chung, H.-L., Chow, H.-K. & Lu, J.-P., 341 (Leish.)
Chwatt, L. J. (823) (Y. F.), 1117 (Mal.)
Chwatt, L. J., with Gordon & Jones, 563 (Hel.)
Ciaccio, G., 451 (Typh.)
——, with Giroud, 539, 625, 717 (Typh.)
——, with —— & Vargues, 717 (Typh.)
Ciferri, R., with Redaelli, 281 (Der.)
Ciuca, M., Alexa, I., Duport, M. & Athanasiu, M., 1115 (Mal.)
——, Ballif, L., Chelaresco, M., Constantinesco, C. & Timişescu, A., 321 (Mal.)
——, ——, —— & Timisesco, A., Vasiliu-Munteanu, F. & Trofin, M. V., 329 (Mal.)
——, ——, ——, Vrabie, M. & Munteanu-Vasiliu, F., 322 (Mal.)
——, Soflete, A., Constantinesco, P. & Teriteanu, N., 324 (Mal.)
Ciurea, V., with Combiesco, Dumitresco, Sturdza, Botez & Zarnea, 931 (Typh.)

Clark, G. C., with Brown, Sinclair, Cronk & Kuitunen-Ekbaum, 376 (Hel.)
Clark, H. C., 1190 (Reports, etc.)
Clark, M., 283 (Der.) (1133) (Leish.)
Clark, R. H. P., Bercovitz, Z. T. & Jones, R. F., 144 (Am.)
Clark, W. H., with Lennette & Dean, 1138 (Typh.)
Clarke, G. H. V. (905) (Mal.)
Clément, R., Gerbeaux, J. & Satgé, P., 112 (Mal.)
Clerc, M., 418 (Reports, etc.)
Clerc, S. & Bergeret, C., 365 (Am.)
Clough, P. W., with Stitt, Branham & contributors, 185 (B.R.)
Coatney, G. R., 702 (Mal.)
——, with Bennison, 220 (Mal.)
—— & Cooper, W. C., 105 (Mal.)
——, with ——, Ruhe & Josephson, 1111 (Mal.)
——, with ——, ——, —— & Young, 1004 (Mal.)
——, with ——, ——, ——, —— & Burgess, 1007 (Mal.)
——, with Rein, Bukantz, Kent, Cooper & Ruhe, 1107 (Mal.)
——, with Ruhe, Cooper & Josephson, 1111, 1112 *bis* (Mal.)
——, ——, ——. —— & Young, M. D., 1006 (Mal.)
——, with ——, ——, —— & ——, 1005 (Mal.)
——, with Culwell, Cooper, White & Lints, 905 (Mal.)
——, with White, Cooper, Culwell, Lints & Young, 906 (Mal.)
Cochet, G., with Coutelen & Biguet (146) *ter* (549), 637, 941 (Am.), 571 (Der.), 951 (Hel.)
Cochran, J. H., with Greenwald & Scharff, 111 (Mal.)
Cochrane, R. G., 48, 264 (747) (Lep.)
——, with Rajah & Raj, 370 (Lep.)
——, Ramanujam, K., Paul, H. & Russell, D., 747 (Lep.)
Cockburn, T. A., 261 (Am.)
Cockings, K. L., 132 (Typh.)
Codeleoncini, E., 1032 (Am.)
——, with d'Ignazio, 25, 450 (Typh.)
Coêlho, B., Menezes, H. & Magalhaes, A., Jr., 1158 (Hel.)
Coelho, E., 740 (Am.)
Coelho, M. F., with de Azevedo, Roque, Colaço, Cristino & Rés, 1062 (Hel.)
——, with ——, da Silva, Coito & Colaço, 1056 (Hel.)
Coelho, R. D., with Boyd, 804 (Mal.)
Coggeshall, L. T. & Rice, F. A., 706 (Mal.)
Coghill, N. F., with Gambles, 470 (R.F.)
Coito, A. de M., with de Azevedo, da Silva, Coelho & Colaço, 1056 (Hel.)
Colaço, A., with de Azevedo, Roque, Cristino, Res & Coelho, 1062 (Hel.)
——, with ——, da Silva, Coito & Coelho, 1056 (Hel.)
Cole, M. M., with Smith & Gouck, (930) (Typh.)
Coleman, N., with Haas & Wilcox, 909 (Mal.)
——, with——, ——, Laird & Ewing, 108 (Mal.)
Colette & Porot, M., 607 (Mal.)
Coll, H. A., with Alvarado, 332 (Mal.)
Collazo, P. J., with Diaz-Rivera, Guzman Acosta & Pomales Lebron, 452 (Typh.)
Collins, D. L., Nardy, R. V. & Glasgow, R. D., 821 *bis* (Typh.)
Colonial Office, 96, 502, 676, 977, 1090, 1188 (Reports, etc.)
Colorado Iris, R., with Downs & Gahan, 614 (Mal.)
Coluzzi, A., 1108 (Mal.)
Combiesco, C., with Combiesco, Dumitresco, Popesco & Zarnea, 627, (931) (Typh.)
Combiesco, D., Combiesco, C., Dumitresco, N., Popesco, C. & Zarnea, G., 627, (931) (Typh.)
—— & Dumitresco, N., 627, (930) (Typh.)
——, ——, Botez, V., Sturdza, N. & Zarnea, G., 931 (Typh.)
——, —— & Cotăesco-Manciulesco, E., 928 (Typh.)
——, ——, Sturdza, N. & Botez, V., with Popesco, C., Panaitesco, G. & Zilisteano, C., 929 (Typh.)
——, ——, ——, ——, Ciurea, V. & Zarnea, G., 931 (Typh.)
——, Vasiliu, V. & Dumitresco, N., (930) (Typh.)
Commonwealth Institute of Entomology, 978 (Reports, etc.)
Conejos, M., 534 (Tryp.)
Congo Belge, 415, 785, 1189 (Reports, etc.), 913 (Tryp.)
Conley, R. H., with Zieve, (849) (Hel.)
Constaninesco, C., with Ciuca, Ballif, Chelaresco & Timişescu, 321 (Mal.)
Constaninesco, N., with Balteanu & Toma, (1140) (Rab.)
Constaninesco, P., with Ciuca, Soflete & Teriteanu, 324 (Mal.)
Convit, J., with Vegas & Espin, 1051 (Lep.)
Cook, C. E., 346 (Typh.), 1098 (Reports, etc.)
Cooke, C., 251 (Typh.)
Cooke, J. N. C., with Morton, 243 (Leish.)
Cooley, J. C., with Turnbull, 1034 (Am.)
Coonoor, 588 (Reports, etc.)
Cooper, W. C., 1109 (Mal.)
——, with Coatney, 105 (Mal.)
——, with——, Ruhe, Josephson & Young, 1006 (Mal.)
——, with Culwell, White, Lints & Coatney, 905 (Mal.)
——, with Rein, Bukantz, Kent, Ruhe & Coatney, 1107 (Mal.)
——, Ruhe, D. S., Coatney, G. R. & Josephson, E. S., 1111 (Mal.)
——, with ——, —— & ——, 1111, 1112 *bis* (Mal.)
——, ——, ——, —— & Young, M. D., 1004 (Mal.)
——, with ——, ——, —— & ——, 1005 (Mal.)
——, ——, ——, ——, —— & Burgess, R. W., 1007 (Mal.)
——, with White, Coatney, Culwell, Lints & Young, 906 (Mal.)

Corcos, A., with Dana & Sebag, 341 (Leish.)
Cordero, A. A., with Quiroga & Negroni, 168 (Der.)
Cordero Moreno, R., with Risquez-Iribarren & Anduze, 1082 (Oph.)
Corkill, N. L., 21, 22 (Leish.), 388, 767 (Def. Dis.), 866 (Vms.)
——, Creditor, H. & Stewart, G. E. S., 74, 75 (Def. Dis.)
Cornbleet, T., Schorr, H. C. & Barsky, S., 865 (Haem.)
Cornejo, A., 1017 (Tryp.)
Corradetti, A., 12 (Mal.), 1020, 1134 (Leish.), 1027 (Bart.)
Corsi, C., with Boscardi, 513 (Mal.)
da Costa, A. M. & Bassères, M. S., 330 (Mal.)
Costa, D., 1073 (Def. Dis.)
da Costa, F. C., with de Arruda, Nahas & Rosenfeld, 816 (Leish.)
Costa, L. P., with di Pietro & Niño, 968 (Der.)
Costa, O. G. & Alexio, H. B., 149 (Lep.)
Costhuizen, S. F., 839 (Ys.)
Cotăesco-Manciulesco, E., with Combiesco & Dumitresco, 928 (Typh.)
Cotthill, C. W., with Parmer, 1035 (Am.)
Couceiro, A., 1059 (Hel.)
Coudert, J. & Juttin, P., 976 (Lab.)
Coulston, F., 1009 (Mal.)
—— & Huff, C. G., 106 (Mal.)
——, with Hugg, 104 (Mal.)
Courtois, C., with Liegeois & Rousseau, 136 (Y.F.)
Cousin, R., with Cattan & Frumusan, 486 (Hel.)
Coutelen, F., Biguet, J. & Cochet, G., (146) *ter*, (549), 637 (Am.)
——, Cochet, G. & Biguet, J., 571 (Der.), 941 (Am.), 951 (Hel.)
Coutinho, J. O. & Pessôa, S.B., 1058 (Hel.)
Cova-Garcia, P., 210 (Mal.)
Covell, G., 327 (Mal.)
——, Nicol, W. D., Shute, P. G. & Maryon, M., 325, 437, 703 (Mal.)
Cowper, S. G., 265 (Hel.)
——, with Halawani, Hafez & Newsome, 753 (Hel.)
Cox, H. R., with Fox, Rickard & van der Scheer, 819 (Typh.)
——, with Koprowski, 253, 1140 (Rab.)
Coxon, R. V., 466 (Am.)
Crawford, J. N. & Reid, J. A. G., 71 (Def. Dis.)
Crawford, R. P., with Scott & Jenkins, 775 (Haem.)
Creditor, H., with Corkill & Stewart, 74, 75 (Def. Dis.)
Crewe, W., with Gordon, 514 (Mal.)
Cristino, E., with de Azevedo, Roque, Colaço, Rés & Coelho, 1062 (Haem.)
Criswell, R. H., with Hand, 765 (Hel.)
Critchley, C. F., 42 (Am.)
Crivellari, C. A. & Martín Mendy, R., (1062) (Hel.)
Crofton, H. D., (66) *bis* (Hel.)
Crofts, P. C., with Bennett & Hey, (522) (Mal.)
Cronk, B., with Brown, de Sinner, Green, Gibbons & Kuitunen-Ekbaum, (488) (Hel.)
Cronk, L. B., with Brown, Sinclair, Clark & Kuitunen-Ekbaum, 376 (Hel.)
Crosnier, with Lavier & Merle, 469 (Am.)
Crosnier, J., with Siguier & Piette, 1037 (Am.)
——, with —— & Sapin-Jaloustre, (744) (Am.)
Crosnier, R., Bernier, G., Molinier, A., Besseige, H. & Lefebvre, P., 743 (Am.)
——, with Lavier & Merle, 365 (Am.)
——, Merle, F. & Tabuse, L., 695 (Mal.)
Cross, H. F., with McDuffie, Sharp, Twinn & Wilson, (1088) (Ent.)
—— & Snyder, F. M., 540 *bis*, 820 (Typh.)
——, with ——, 540 (Typh.)
——, with Twinn, Hocking & McDuffie, 580 (Ent.)
Cross, J. B. & Anigstein, L., 92, 1186 (Prot.)
Crougue, O., with Chaussinand & Paris, 372, 375 (Lep.)
Crowden, G. P., 497 (Heat Str.)
Crowther, A. F., with Ashworth, Curd, Hendry, Richardson & Rose, (611) (Mal.)
——, Curd, F. H. S. & Davey, D. G. & Stacey, G. J., (907) (Mal.)
——, ——, Richardson, D. N. & Rose, F. L., (216) (Mal.)
Cruickshank, J. C., 1085 (Misc. Dis.)
Cruise, A. B., with Smadel & Jackson, 1025 (Typh.)
Crusz, H., 65 (Hel.)
Cruz, J. R., Guytingco, A. & Kasilag, W. R., 954 (Hel.)
Cruz, W. O., with Ball, McKee, Anfinsen & Geiman, 117 (Mal.)
Cseh Firtos, S., 1108 (Mal.)
——, with de Jong, (94) (Ent.)
Culbertson, C. G., with Dublin & Friedman, 396 (Der.)
Culp, F. B., with McCord, Kelley & Switzer, 280 (Haem.)
Culwell, W. B., Cooper, W. C., White, W. C., Lints, H. A. & Coatney, G. R., 905 (Mal.)
——, with White, Cooper, Coatney, Lints & Young, 906 (Mal.)
Culwick, A. T., with Fairbairn, 812 (Tryp.)
——, with Ford & Whiteside, 122 (Tryp.)
Cunha, R. A., (368) *bis*, (369) (Lep.)
Curd, F. H. S., with Ainley & Rose, (522) (Mal.)
——, with Ashworth, Crowther, Hendry, Richardson & Rose, (611) (Mal.)
——, with Birtwell, Hendry & Rose, (216) (Mal.)
——, with Crowther, Davey & Stacey, (907) (Mal.)
——, with ——, Richardson & Rose, (216) (Mal.)
—— & Davey, D. G., 338 (Tryp.)
——, Davey & Stacey, G. J., (907) (Mal.)
——, Hendry, J. A., Kenny, T. S., Murray, A. G. & Rose, F. L., (215) (Mal.)
——, Hoggarth, E., Landquist, J. K. & Rose, F. L., (329) (Mal.)
——, Landquist, J. K. & Rose, F. L., (329) (Mal.)
Cymerman, J. & Short, W. F., (706) (Mal.)

D

Dacie, J. V. & White, J. C., (489) (Haem.)
Daengsvang, S., 1069 (Hel.)
Daglio, C. A. N., with Negroni & Briz de Negroni, 167, 1175 (Der.)
Dahl, A. H., 500 (Ent.)
Dakshinamurty, S., 578 (Ent.)
Daland, G. A. & Castle, W. B., 492 (Haem.)
Dalencour, L., (112) (Mal.)
Damasceno, R. G., with Galvão, 442 (Mal.)
Damkas, C., with Foy, Kondi, Depanian, Lefcopoulou, Bach, Dax, Pitchford, Shiele & Langton, 316 (Mal.)
Dana, R., Corcos, A. & Sebag, A., 341 (Leish.)
Danciger, J. A., with Fraser & Rosenblum, 350 (Typh.)
D'Arcy, T. M. W., 216 (Mal.)
Dauben, W. G., with Fieser, Chang, Heidelberger, Heymann & Seligman, (115) (Mal.)
Davenport, H. E., (854) *bis* (Hel.)
Davey, D. G., with Crowther, Curd & Stacey, (907) (Mal.)
——, with Curd, 338 (Tryp.)
——, with —— & Stacey, (907) (Mal.)
Davey, F. & Smith, M., 706 (Mal.)
Davey, T. H., 221 (Tryp.)
David, P., with Zalman & Hortopanu, 538 (Typh.)
Davidson, G., 329 (Mal.)
Davidson, L. S. P., 79 (Haem.)
Davies, J. N. P., (90), 575, 873 (Misc. Dis.)
Davies, W. H. & Sexton, W. A., (412) (Ent.)
Davis, C. & Ritchie, L. S., 548 (Am.)
——, with ——, 547 (Am.)
Davis, D. E. & Fales, W. T., 825 (Pl.)
Davis, D. H. S., 31, (737) (Pl.)
Davis, F. W., Jr., 939 (Am.)
Davison, C., with Gimble & Smith, P. K., 467 (Am.)
Davison, L. E., with Duffy, (340) (Leish.)
Dawson, C. E. & Blagg, W., 143 (Chl.)
Dawson, J., Findlay, G. M. & Ward, R. D., 278 (Def. Dis.)
Dax, R., with Foy, Kondi, Damkas, Depanian, Lefcopoulou, Bach, Pitchford, Shiele & Langton, 316 (Mal.)
Day, 57 (Hel.)
Dean, B. H., with Lennette & Clark, 1138 (Typh.)
Deane, L. M., Causey, O. R. & Deane, M. P., 319 (Mal.)
——, Freire, E. P. S., Tabosa, W. & Ledo, J., 331 (Mal.)
Deane, M. P., with Deane & Causey, 319 (Mal.)
Dearborn, E. H., 333 (Mal.)
DeBakey, E. G., with Ochsner & Dixon, 955 (Hel.)
Debenham, F., 676 (Reports, etc.)
Decourt, P., with Pelloux, 814, 1131 (Tryp.), 1188 (Ent.)
Deeb, A. A., with Erfan, Erfan & Mousa, 643 (Hel.)
De la Garza Brito, A. & Treviño Villaseñor, A., 1147 (Mal.)
Delahousse, J., 15 (Mal.)
Delanoe, E., 668 (Oph.)
de la Riva, G. E., 872 (Misc. Dis.)
Delbove, P., 206 *bis*, 207 *bis* (Mal.)
—— & Capponi, M., 206, 513 (Mal.)
Del Carmen Núñez, M. & Mazzotti, L., 388 (Hel.)
Del Giudice, V., with Baldi, 434 (Mal.)
Delperdange, G. R., 149 (Lep.)
Delpy, L. P., (876) (Ent.), 1048 (R.F.)
——, Rafyi, A. & Maghami, G. D., 44 (R.F.)
Del Pozo, E. C., 776 (Vms.)
Del Rosario, F., with Dy, 517 (Mal.)
Del Vecchio, G. & Del Vecchio, V., 8 (Mal.)
Del Vecchio, V., with Del Vecchio, 8 (Mal.)
Denlinger, R. B., 727 (Typh.)
Dennis, E. W., with Berberian, 707 (Mal.)
Dent, J. E., Morlan, H. B. & Hill, E. L., 929 (Typh.)
Depanian, M., with Foy, Kondi, Damkas, Lefcopoulou, Bach, Dax, Pitchford, Shiele & Langton 316 (Mal.)
Derrick, E. H., 41 (Am.)
—— & Brown, H. E., 930 (Typh.)
——, with Johnson, 397 (Der.)
Desai, S. D., with Figueredo, 373, 1052 (Lep.)
Deschamps, G., with Beaver, 829, 830 (Am.)
Deschiens, R., 850 (Hel.)
—— & Bablet, J., 65 (Hel.)
——, Lamy, L. & Marchal, G., 367 (Am.)
—— & Pick, F., 482 (Hel.), 672 (Ent.)
—— & Poirier, M., 851 (Hel.)
Desai, S. D., with Figueredo, 373, 1052 (Lep.)
Desai, V. G., with Koenigsfeld, 389 (Def. Dis.)
Dessausse, with Audoye, (153) (Hel.)
Dethier, V. G. & Chadwick, L. E., 404 (Ent.)
——, with ——, 404 (Ent.)
Dévé, F., 1099 *bis* (B.R.)
Devignat, R., 737 (Pl.)
Dewey, H. M. & Wormall, A., 337 (Tryp.)
Dewhurst, K. E., 555 (Hel.)
Dharmendra, 264, (746) (Lep.)
——, with Chatterjee, 668 (Oph.)
—— & Jaikaria, S. S., 369 (Lep.)
—— & Mukherji, N., 368, (479) (Lep.)
Diallo, J., with Brun-Buisson, Piriou & Caille, 123 (Tryp.)
Dias, E., (501) (Ent.)
——, Laranja, F. S. & Pellegrino, J., 620 (Tryp.)
—— & Pellegrino, J., 20 (Tryp.)
Diaz, R., with Rodriguez-Molina, Lang, Acevedo & Jiminez-Torres, 558 (Hel.)
Díaz Nájera, A., with Vargas, 407, (876) (Ent.)
Diaz-Rivera, R. S., Guzman Acosta, C., Collazo, P. J. & Pomales Lebron, A., 452 (Typh.)
Dick, G. W. A., with Haddow, 458 (Y.F.)
——, with ——, Smithburn, Kitchen & Lumsden, 457 (Y.F.)
—— & Smithburn, K. C., 542 (Y.F.)
Dickinson, W. H., Merritt, D. & Hough, J., 291 (Ent.)
Dickstein, B., Landmesser, W. E., Jr., Love, W. E., Wilson, T. H. & Wolman, I. J., 773 (Haem.)
Dieke, S. H., 461 (Pl.)
Diercks, F. H., with Bailey & Proffitt, 348 (Typh.)
Diez, R., with Vigil & Piñeyrua, (65) (Hel.)
Diez de Urdanivia, A. & Estrada Berg., J., 970 (Misc. Dis.)

Dimitriu, A., with Zaharia, 928 (Typh.)
Diniz, O., with Stancioloi, 944 (Lep.)
Dirnhuber, P., with Chance, (486) (Hel.)
Dixon, J. L., with Ochsner & DeBakey, 955 (Hel.)
Doeleman, H. & van Thiel, P. H., 314 (Mal.)
Dold, H. & Themme, H., 761 (Hel.)
Doll, R. & Schneider, R., 326 (Mal.)
Donaldson, A. W., with Brooke & Mitchell, 1071 (Hel.)
Donaldson, R., with King, Wootton, Sisson & Macfarlane, 663 (Haem.)
Donoso Barros, R., 394, 1169 (Vms.), 1087 (Ent.)
Do Prado, F. C., 364, 940 (Am.)
Dostrovsky, A. & Sagher, R., 868 (Der.)
Doucet, G., 214 (Mal.)
Doucet, J., with Grenier, (1088) (Ent.)
Douglas, B. & Kermack, W. O., (806) (Mal.)
Dounet, G., with Bernard & Jaujou, 736 (Pl.)
Dove, W. E., with Sarles & Moore, (584) (Ent.)
Dowding, E. S., 395 (Der.)
Downie, G. L., (461) (Pl.)
Downs, W. G. & Baker, R. H., 673 (Ent.)
——, Colorado Iris, R. & Gahan, J. B., 614 (Mal.)
——, with Gahan & Celis, 1119 (Mal.)
Doxiades, T. & Tiliakos, M., 164 (Def. Dis.)
Drake, N. L., Hayes, R. A., Garman, J. A., Johnson, R. B., Kelley, G. W., Melamed, S. & Peck, R. M., (611) (Mal.)
Dreguss, M. & Farkas, E., 345, 346 (Typh.)
Dreisbach, R. H., (607) (Mal.)
Drysdale, A. D., with Pratt & Kirk, 1021 (Typh.)
Dubin, I. N., 429, 526 (Mal.)
Dublin, W. B., Culbertson, C. G. & Friedman, H. P., 396 (Der.)
Dubois, A., 276 (Hel.), 836 (R.F.)
—— & Van den Berghe, L., 298, 1196 (B.R.)
Dubrûle, M., with Browning, Fraser, Shapiro & Glickman, (410) (Ent.)
——, with —— & Shapiro, (410) (Ent.)
Duffy, J. P. & Davidson, L. E., (340) (Leish.)
Dugger, S., with Zimmerman, 664 (Haem.)
de Dulanto, F., 47 (Lep.)
Dumitresco, N., with Combiesco, 627, (930) (Typh.)
——, with ——, Botez, Sturdza & Zarnea, 931 (Typh.)
——, with ——, Combiesco, Popesco & Zarnea, 627, (931) (Typh.)
——, with —— & Cotăesco-Manciulesco, 928 (Typh.)
——, with ——, Combiesco, Sturdza, Botez, Ciurea & Zarnea, 931 (Typh.)
——, N., with ——, ——, ——, Popesco, Panaitesco & Zilisteano, 929 (Typh.)
——, with —— & Vasiliu, (930) (Typh.)
Duncan, J. T., 395 (Der.)
Duport, M., with Ciuca, Alexa & Athanasiu, 1115 (Mal.)
Duque, M., with Ejercito, 611 (Mal.)
Durand-Delacre, R., (499) (Ent.)
——, with Parrot, (499) (Ent.)
Durieux, C., 416, 1095 (Reports, etc.)
Dutt, A. K., with Bhattacharyya, Bhowmik & Ray, (1089) (Ent.)
Duvolon, S., with Stefanopoulo, 629 (Y.F.)
Duvolon-Rafin, S., with Rousselot, 262 (R.F.)
Dwinelle, J. H., with Rein, Sternberg & Sheldon, 551 (Ys.)
Dwork, K. G., with Shookhoff, 1165 (Hel.)
Dy, F. J. & Del Rosario, F., 517 (Mal.)
—— & Gapuz, R. B., 518 (Mal.)
——, with Smith & Cabrera, 612 (Mal.)
Dyer, R. E., 726 (Typh.)

E

Eads, R. B., with Randolph & Ogden, 818 (Typh.)
Eareckson, W. M., with Svirbely, Matsuda, Pickard, Solet & Tuemmler, (676) (Ent.)
Early, E. P. M. N., 768 (Def. Dis.)
East African Med. J., 99 (Reports, etc.), 151 (Hel.)
Ebert, C., 857 (Hel.)
Ecker, E. E., with Kirk, 1028 (Rab.)
Eckstein, A., 881 (B.R.)
Eddey, L. G., 589 (Reports, etc.)
Edelman, M. H., with Spingarn, 465 (Am.)
Edelstein, A., with Krakowski, 835 (R.F.)
Edeson, J. F. B., with Field, 808 (Mal.)
Edmonds, A. R., (875) (Prot.)
Edwards, J. T., 235 (Tryp.)
Efrati, P., 867 (Vms.)
Egeli, E. S. & Ergun, S., (78) (Haem.)
Ehrich, W. E., Seifter, J., Alburn, H. E. & Begany, A. J., 487 (Hel.)
Eichbaum, F. W., 54 (Hel.) 82 *bis* (Vms.)
——, with Leão, 54 (Hel.)
Eichelberger, L., with Atchley, Young, Husted, Pullman & Alving, 214 (Mal.)
Eichenwald, H., 875 (Prot.)
Eisentraut, M., with Klose, 426 (Mal.)
Ejercito, A. & Duque, M., 611 (Mal.)
Ekblom, T., 205 (Mal.)
El-Ghaffar, Y. A., 742 (Am.)
Eliot, T. S., with Knisely, Bloch & Warner, 12 (Mal.)
El Kordy, M. I., (363) (Am.), 1090 (Lab.)
——, with Halawani, 942 (Am.)
Elliott, D. C., 669 (Oph.)
Eliott, D. E., with Hingson, Johansen, Erickson, Meyer, Fite, Wolcott & Prejean, 51 (Lep.)
Elsdon-Dew, R., with Armstrong & Marot, 831 (Am.)
——, with —— & Pooler, 259 (Am.)
——, with —— & Wilmot, 831 (Am.)
Emmons, C. W., 1080 (Der.)
—— & Ashburn, L. L., 495 (Der.)
Epstein, E., (65) (Hel.)
Ercole, Q. N., with Mackerras, 429, 430, 431, 700 *bis* (Mal.)
Erdei, A., 363 (Am.)
Erfan, H., with Erfan, Mousa & Deeb, 643 (Hel.)
Erfan, M., 57 (Hel.)
——, Erfan, H., Mousa, A. M. & Deeb, A. A., 643 (Hel.)
Ergun, S., with Egeli, (78) (Haem.)
Erhardt, A., 766 (Hel.)

Erickson, P. T., with Hingson, Johansen, Elliott, Meyer, Fite, Wolcott & Prejean, 51 (Lep.)
—— & Johansen, F. A., 50 (Lep.)
Erzin, N., 343 (Typh.)
d'Eshougues, J. R., 1132 (Leish.)
—— & Messerschmitt, J., 924 (Leish.)
Eskola, O., 483 *bis* (Hel.)
Espin, J., with Vegas & Convit, 1051 (Lep.)
Espinosa, A., with Arenas, Padrón & Andreu, 271 (Hel.)
Espinosa, H., with Freeman & Castillo Sologuren, 537 (Typh.)
Esselier, A. F., with Löffler & Macedo, 871 (Misc. Dis.)
Esseveld, H., with Kouwenaar, 723 (Typh.)
Esteller, J., with Vilanova, 478 (Lep.)
Esterer, M. B., with Lewis, Fajans, Shen & Oliphant, 399 (Misc. Dis.)
Estrada Berg, J., with Diez de Urdanivia, 970 (Misc. Dis.)
Estrella, R. J. A., (501) (Ent.)
Etherington, D., 908 (Mal.)
Ettlinger, M. G., with Fieser & Fawaz, (115) (Mal.)
Evans, A. S., 23 (Typh.)
Evans, G., 502 (Reports, etc.)
Ewing, F. M., with Haas, Wilcox, Laird & Coleman, 108 (Mal.)
Eyles, D. E., with Young & Burgess, 322 (Mal.)

F

Fadem, R. S., 1075 (Haem.)
Faiguenbaum, A., J., with Neghme, Pilotti & Silva Campos, 852, 951 (Hel.)
Fain, A. & de Mulder, P., 239 (Tryp.)
Fairbairn, H. & Culwick, A. T., 812 (Tryp.)
Fairchild, G. B. & Hertig, M., 582 (Ent.)
Fairley, N. H., 1111 (Mal.)
Fajans, R. S., with Lewis, Esterer, Shen & Oliphant, 399 (Misc. Dis.)
Fakacelli, N. M., (21) *bis* (Leish.)
Falco, E. A., Hitchings, G. H., Russell, P. B. & VanderWerff, H., 1125 (Hel.)
Fales, W. T., with Davis 825 (Pl.)
Fallas Diaz, M., with Peña Chavarria, Ovares Arias, Romero López & Castro Jenkins, 342 (Leish.)
Fallis, A. M., 561 (Hel.)
Faria, G. S., with Americano Freire, 212 (Mal.)
de Faria, J. L., 1149 (Lep.)
——, with Lacaz & Moura, (397) (Der.)
Farid, M. A., 516 (Mal.) 673 (Ent.)
Farkas, E., with Dreguss, 345, 346 (Typh.)
Faust, E. C., 923 (Tryp.)
——, & Bonne, C., 59 (Hel.)
——, with Brannon, 955 (Hel.)
——, & Hemphill, F. M., 603 (Mal.)
Fauvert, R., with Bertrand-Fontaine & Schneider, 362 (Am.)
Favarel, R., 357 (Pl.)
——, Carrière, M. & Chartres, A., (255) (Pl.)
Fawaz, G., with Fieser & Ettlinger, (115) (Mal.)
Fawdry, A. L., 567 (Haem.)
Fay, R. W., Buckner, A. J. & Simmons, S. W., 583 (Ent.)
Fay, R. W., with McCauley & Simmons, 524 (Mal.)
Feigelson, P., with Manwell, 1011 (Mal.)
Felner, P., with Neghme & Hoecker, 859 (Hel.)
Felsenfeld, O., 359 (Chl.)
Feng, L. C., with Hoeppli, (1021) (Leish.)
——, & Lu, W. C., 1018 (Leish.)
Feoli, L. S. J., with Gunche & Radice, (167) (Der.)
Ferguson, F. F., Upholt, W. M. & Simmons, S. W., 708 (Mal.)
Ferguson, J. W. & Calder, E., 77 (Sp.)
Fernandez, J. M. M., Carboni, E. A. Tommasino, P. & Gimenez, M. M., 480 (Lep.)
Fernando, P. B., Medonza, O. R. & Rajasuriya P. K., 161 (Def. Dis.)
Féron, J., 854 (Hel.)
Ferrari, A., 520 (Mal.)
Ferraz, D. M., with Rachou & Ferreira, 800 (Mal.)
Ferreira, F. C. & Lopez, E. M. R., 1068 (Hel.)
Ferreira, F. S. C., 844 (Hel.)
Ferreira, F. S. da C., 530, 1013 (Tryp.)
——, Pinto, A. R. & de Almeida, C. L., 1105 (Mal.), 1127 (Tryp.)
Ferreira, M. O., 332 (Mal.)
——, with de Bustamante & Rachou, 1120 (Mal.)
——, with Rachou & Ferraz, 800 (Mal.)
——, ——, & de Bustamente, F. M., 1120 (Mal.)
Ferreira, T., (619) (Tryp.)
Ferro-Luzzi, G., 213, 705 (Mal.), 344 (Typh.)
Fidanza, E. P., 264 (Lep.)
Field, J. W., 1107, 1110 (Mal.)
——, & Edeson, J. F. B., 808 (Mal.)
Fieser, L. F., (115) *ter* (Mal.)
——, Chang, F. C., Dauben, W. G., Heidelberger, C., Heymann, H. & Seligman, A. M. (115) (Mal.)
——, Ettlinger, M. G. & Fawaz, G., (115) (Mal.)
—— & Fieser, M., (115) (Mal.)
—— & Heymann, H., (329) (Mal.)
——, with ——, (115), (329) (Mal.)
——, —— & Seligman, A. M., (115) (Mal.)
—— & others, (115) *bis* (Mal.)
—— & Richardson, A. P., (115) (Mal.)
Fieser, M., with Fieser, (115) (Mal.)
Figgat, W. B., with Newton & Bennett, 85 (Hel.)
de Figueireda, J. M. P., 361 (Am.)
Figueredo, N. & Desai, S. D., 373, 1052 (Lep.)
Filer, M. K., with Baranger, 446 (Mal.)
Findlay, G. M., 932 (Y.F.)
——, with Dawson & Ward, 278 (Def. Dis.)
Fink, H., 154 (Hel.)
Firestone, G. M. & Benson, E. S., 870 (Der.)
Firlotte, W. R., with Miller, 635 (Am.)
Fischer, L., 426 (Mal.)
Fisher, M. W., with Gutner, 90 (Misc. Dis.)
Fite, G. L., 264 (Lep.)
——, with Blanco, 943 (Lep.)
——, with Hingson, Johansen, Erickson Elliott, Mayer, Wolcott & Prejean, 51 (Lep
——, with Leon Blanco, 478 (Lep.)
Fitzhugh, O. G., with Nelson, (214) (Mal.)

Fitzpatrick, F. K., 453 (Typh.)
Fleming, E. M., with Shen & Castle, 1074 (Haem.)
Fletcher, O. K., Jr., 116 (Mal.)
Floch, H., 371 (Lep.)
—— & Abonnenc, E., (94) *bis* (582) (Ent.), (924) (Tryp.), (1008) (Mal.)
—— & Camain, R. (66), 853 (Hel.), (148), 477, 479, 746, 748 *bis* (Lep.)
—— & Chassignet, R., (94) (Ent.)
—— & de Lajudie, P., (1068) (Hel.), 1087 (Misc. Dis.)
Florenzano, R., with Pizzi & Valle, 340 (Tryp.)
Floris, M., 117 (Mal.)
——, with Spanedda, 797 (Mal.)
Flusser, J. & Vrzala, K., 18 (Bl.)
da Fonseca, F. & de Azevedo, J. F., 62 (Hel.)
Fonseca, F. & Wohlwill, F., with Pinto, M. R., 1195 (B.R.)
Fonseca, L. C., 863 (Haem.)
Forattini, P. P., (70) (Hel.)
Forbes, J. & Horsfall, W. R., 1187 (Ent.)
Forbes, M. A., Jr., 1020 (Leish.)
Ford, J. & Hall, R. de Z., 504 (Reports, etc.)
——, Whiteside, E. F. & Culwick, A. T., 122 (Tryp.)
Forshaw, H. W., with de Burca, 11 (Mal.)
Fort, M., with Schwetz & Baumann, 897 (Mal.)
Fourman, L. P. R., 284 (Heat Str.)
Fournier, J., 787 (Reports, etc.)
Fourrier, A., with Thiodet, 215 (Mal.)
Fox, H., 777 (Der.)
Fox, H. J., 965, 1073 (Sp.)
Fox, I., with Maldonado, Hernández Morales & Thillet, 762 (Hel.)
Fox, J. P., 817, 819 (Typh.)
——, with Gallardo, 451 (Typh.)
——, with Perez Gallardo, 24 (Typh.)
——, Rickard, E. R., Van der Scheer, J. & Cox, H. R., 819 (Typh.)
——, with Ris, 928 (Typh.)
Foy, H., Kondi, A., Damkas, C., Depanian, M., Lefcopoulou, T., Bach, L. G., Dax, R., Pitchford, J., Shiele, P. & Langton, M., 316 (Mal.)
Fradkin, R., with Schmidt, Genther & Squires, 709 (Mal.)
Francis, E., 630 (Pl.)
Franco, L. B., with Micks & de Caires, 335 (Mal.)
Franco, S., with Sagher, 51 (Lep.)
Frank, H. R., 1023 (Typh.)
Fraser, F. C., with Browning, Shapiro, Glickman & Dubrûle, (410) (Ent.)
Fraser, L. E., Rosenblum, H. & Danciger, J. A., 350 (Typh.)
Freedman, M., with Sadusk & Hjerpe, 246 (Typh.)
Freeman, G., Castillo Sologuren, F. & Espinosa, H., 537 (Typh.)
——, Varela, G., Plotz, H. & Ortiz Mariotte, C., 536 (Typh.)
Freire, E. P. S., with Deane, Tabosa & Ledo, 331 (Mal.)
Freire, F., Jr., with de Oliveira, 896 (Mal.)
Freire de Guzman, A. R., with Asenjo, Mayorel de Asenjo & de Lopez Candal, 447 (Mal.)
de Freitas, J. L. P. & de Almeida, J. O., 1129 (Tryp.)
Frenkel, J. K., 402, 1184 (Prot.)
Freund, J., Lipton, M. M. & Pisani, T. M., 140 (Rab.)
Friedheim, E. A. H., 711 *ter* (Tryp.), 839 (Ys.)
——, Vogel, H. J. & Berman, R. L., 918 (Tryp.)
Friedlander, J. & Moss, G., 1176 (Der.)
Friedman, H. P., with Dublin & Culbertson, 396 (Der.)
Friedman, M., with Rinehart & Greenberg, 1167 (Def. Dis.)
Fritz, R. F., with Wiley, 247 (Typh.)
Frohne, W. C. & Hart, J. W., 1002 (Mal.)
Frumusan, P., with Cattan & Cousin, 486 (Hel.)
Frye, W. W., with Shaffer & Ryden, 634 (Am.)
Fuentes Delgade, M., (850) (Hel.)
Fuksumi, S., with Kawamura, Itoh, Itoh, Takagi & Obata, 458 (Den.)
Fuller, H. S., (499) (Ent.)
Fulton, J. D., with Ada, 925 (Leish.)
—— & Goodwin, T. W., 916 (Tryp.)
Furcolow, M. L. & Ruhe, J. S., 1171 (Der.)
Furtado, T. A., with Aleixo, 283 (Der.)

G

Gabaldon, A., with de Perez, G. G., 6 (Mal.)
Gaehlinger, H., 937 (Am.)
de Gaetani, G. F., (605) (Mal.)
Gage, J. C., (522), (611), (907) (Mal.)
——, Rose, F. L. & Scott, M., 338 (Tryp.)
Gahan, J. B., Downs, W. G. & Celis, H., 1119 (Mal.)
——, with —— & Colorado Iris, 614 (Mal.)
——, Gilbert, I. H., Peffly, R. L. & Wilson, H. G., 500 (Ent.)
——, with Peffly, 878 (Ent.)
Gaines, T. B., with Nicholson, McWilliams & Vetter, 26 (Typh.)
Gallardo, F. P. & Fox, J. P., 451 (Typh.)
Galliard, 987 (Reports, etc.)
Galliard, H., 64, 153, 560 (Hel.), 286 (Misc. Dis.)
—— & Mille, R., 1064 (Hel.)
—— & Ngu, D. V., 67 (Hel.)
Gallik, L., with Wolfe & Kornfeld, 456 (Typh.)
Gallut, J., 631 (Chl.)
—— & Brounst, G., 935 (Chl.)
Galvão, A. L. A. & Damasceno, R. G., 442 (Mal.)
Galvão, P. E., (497) *bis* (Heat Str.)
Galvez Fermin, N., (380) (Hel.)
Gambles, R. M. & Coghill, N. F., 470 (R.F.)
Gan, K. H., 941 (Am.)
Ganapati, P. N., 339 (Tryp.)
Gapuz, R. B., with Dy, 518 (Mal.)
Garcia Capurro, R., with Arana Iñiguez & Caubarrere, (382) (Hel.)
Garcia Carrillo, E., (784) (Misc. Dis.)
Garcia, E. Y., 1112 (Mal.)
Garcia, L. S., with Morales & Ortiz, 1108 (Mal.)
Garcia Lopez, G., Milanes, F., Lopez Toca, R., Aramburu, T. & Spies, T. D., 279 (Sp.)
——, with Spies, Milanes, Lopez Toca & Aramburu, 864 (Haem.)

Garcia Lopez, with Spies, Milanes, Stone, Lopez Toca, Aramburu & Kartus, 1073 (Haem.)
——, with ——, Stone, Milanes, Lopez Toca & Aramburu, 80, 1167 (Haem.)
——, with ——, Suarez, Milanes, Stone, Lopez Toca, Aramburu & Kartus, 566 (Haem.)
Garlick, H. W., with Wood, Motteram, Weiden, Moore, Mackay & Turner, 860 (Def. Dis.)
Garman, J. A., with Drake, Hayes, Johnson, Kelley, Melamed & Peck, (611) (Mal.)
Garnham, P. C. C., 898, 1113, 1114 (Mal.), 542, 932 (Y.F.)
——, Wilson, D. B. & Wilson, M. E., 10 (Mal.)
Gärtner, H. & Müting, L., 1054 (Hel.)
Garzoli, R. F., with Levine, Kuntz & Killough, 56 (Hel.)
Gasq, 238 (Tryp.)
Gasq, M., 914, 918 (Tryp.)
Gattner, H., 834 (Am.)
Gaud, J., 317, 432 (Mal.)
——, with Senevet & Millet, (876) (Ent.)
Gauld, R. L., Schlingman, A. S., Jackson, E. B., Manning, M. C., Batson, H. C. & Campbell, C. C., 826 (Chl.)
Gault, E. W. & Balassubrahmanyan, M., 484 (Hel.)
Gear, J. & Harington, A. L., 1025 (Typh.)
Gebert, S., 440 (Mal.)
Geigy, R., 122 (Tryp.), 1089 (Ent.)
Geiling, E. M. K., with Cantrell & Kelsey, 911 (Mal.)
Geiman, Q. M., with Ball, McKee, Anfinsen & Cruz, 117 (Mal.)
Gelfand, M., 56, 266, 267, 644 (Hel.), 573, 575, 1086 (Misc. Dis.)
—— & Ross, W. F., 378, 846 (Hel.)
Gelin, G., (1145) (Am.)
Genther, C. S., with Schmidt, Fradkin & Squires, 709 (Mal.)
Gerbeaux, J., with Clément & Satgé, 112 (Mal.)
Germer, W. D., with Heni, 351 (Typh.)
Gerundo, M., (470) (Am.)
Ghanem, M. H. & Mikhail, M. N., 1030 (Chl.)
Ghareeb, A. A., (379) (Hel.)
Ghosh, B. N., 188 (B.R.)
Ghosh, L. M., 570 (Der.)
Ghosh, M., with Krishman, Smith, Bose, Neogy & Roy, 719, 721 *ter* (Typh.)
Gibbons, J. E., with Brown, Cronk, deSinner, Green & Kuitunen-Ekbaum, (488) (Hel.)
Giglioli, G., 183 (B.R.), 1119 (Mal.)
Gilbert, A., 717 (Typh.)
Gilbert, I. H., with Gahan, Peffly & Wilson, 500 (Ent.)
Gilbertson, W. E., with Andrews, 440 (Mal.)
Gilchrist, H., with Ruegsegger, 935 (Pl.)
Gilchrist, M., with King, Wootton, O'Brien, Jope, Quelch, Peterson, Strangeways & Ramsay, 662 (Haem.)
——, with Macfarlane, King & Wootton, 661 (Haem.)
Gimble, A. I., Davison, C. & Smith, P. K., 467 (Am.)
Giminez, M. M., with Fernandez, Carboni & Tommasino, 480 (Lep.)
Ginsburg, J. M., (94), 412 (Ent.)
Giovanardi, A., Sepulcri, P. & de Negri, U., 906 (Mal.)
Giroud, P., 27 (Typh.)
—— & Ciaccio, G., 539, 625, 717 (Typh.)
——, —— & Vargues, R., 717 (Typh.)
—— & Jezierski, A., 24 (Typh.)
Gispen, R., Smit, A. M. & Westermann, C. D., 1024 (Typh.)
Gitlin, G., Schaffer, S. & Gunn, C. S., 751 (Hel.)
Gjullin, C. M., with Travis, Blanton, Smith & Wilson, (1088) (Ent.)
Glagoleva, E. M., 10 (Mal.)
Glasgow, R. D., with Collins & Nardy, 821 *bis* (Typh.)
Glickman, I., with Browning, Fraser, Shapiro & Dubrûle, (410) (Ent.)
Go, K., with Magara, So & Akima, 782 (Ulc.)
Goarnisson, J., 990 (B.R.)
Goble, F. C., 1131 (Tryp.)
Gogolak, F. M., with Pitner & McNamara, 60 (Hel.)
Gohar, M. A. & Makkawi, M., 36 (Chl.)
Golberg, L. & de Meillon, B., (408) *bis* (Ent.)
Gold, S., (47) (Lep.)
Goldberg, E., with Schubert & Schreiber, 646 (Hel.)
Goldman, M., 502 (Lab.)
Golmsmit, L., with Komarov, 1138 (Typh.)
Gomes, J. M., 945 (Lep.)
Gómez, L., 93 (Ent.)
Gomez, J. de Cisneros, J. M., 126 (Leish.)
Gomez Marcano, A., (211) (Mal.)
——, with Anzola Falcon & Lopez, 12 (Mal.)
Gomez Vargas, M., with Bonilla Naar, 642 (Hel.)
Gönnert, R., (1058), 1154 (Hel.)
——, with Kikuth, 481 (Hel.)
González, A., with Pacheco, Urcuyo, Jiméniz, Butts & Hernán Páez, 435 (Mal.)
Gonzalez Prendes, M. A., with Oteiza & Ibarra Perez, 842 (Lep.)
González Rivera, M., (880) (Reports, etc.)
Gonzalez Vicente, D., 124 (Tryp.)
Good, N. E. & Kotcher, E., 625 (Typh.)
Goodliffe, F. A. & Blair, D. M., 55 (Hel.)
Goodwin, T. W., with Fulton, 916 (Tryp.)
van Goor, W. T., 110 (Mal.)
Gordon, D. A., with Oliphant, Meis & Parker, 457 (Typh.)
Gordon, J. E. & Augustine, D. L., 572 (Misc. Dis.)
Gordzialkowski, H., 1083 (Ulc.)
Gordon, R. M., Chwatt, L. J. & Jones, C. M., 563 (Hel.)
—— & Crewe, W., 514 (Mal.)
Gouck, H. K., with Smith & Cole, (930) (Typh.)
Goyal, R. K., 493, 568 (Vms.)
de Graaf, W., 901 (Mal.)
Grace, H. K., with Abdou, 269 (Hel.)
Gradwohl, R. B. H., 294, 295 (B.R.)
—— & Kouri, P., 296 (B.R.)
Gramiccia, G., 445 (Mal.)
Granett, P., with Sacktor & Hutchinson, 175 (Ent.)
Granier, M., with Holz, (215) (Mal.)
Grasset, E., (775) (Vms.)
Grassi-Bertazzi, C., 131 (Typh.)

Gratch, I., Purlia, P. L. & Martin, M. L., 737 (Pl.)
Gray, A. & Hill, J., 711 (Mal.)
Gray, H. F. & Peters, R. P., 290 (Ent.)
Greaves, F. C., 585 (Reports, etc.)
Green, J. E., with Brown, Cronk, de Sinner, Gibbons & Kuitunen-Ekbaum, (488) (Hel.)
Green, R. & Mankikar, D. S., 498 (Misc. Dis.)
Greenberg, J., 912, 1124 (Mal.)
——, Boyd, B. L. & Josephson, E. S., 119 (Mal.)
——, with Josephson, Taylor & Nadel, 1011 (Mal.)
——, with Nadel, Taylor & Josephson, 809 (Mal.)
Greenberg, L. D., with Rinehart, 1167 (Def. Dis.)
——, with —— & Friedman, 1167 (Def. Dis.)
Greenspan, E. M., with Schoenbach, 916 (Tryp.)
Greenwald, I., (874) (Misc. Dis.)
Greenwald, M., Cochran, J. H. & Scharff, D. K., 111 (Mal.)
Greenwood, K., 1077 (Der.)
Greer, W. E. R., 394 (Vms.)
Gregoire, J., with Sohier & Ranc, 521 (Mal.)
Greiff, D. & Pinkerton, H., 246 (Typh.)
Grenier, P. & Doucet, J., (1088) (Ent.)
Griffin, A. M. & McCarten, W. G., 829 (Am.)
Griffin, J. F., with Hering, 443 (Mal.)
Griffiths, S. B. & Lipschitz, R., 1169 (Haem.)
Grillo, J., 749 (Lep.)
Grilo, M., with Moutinho & de Moura, 1082 (Oph.)
Grober, J., 594 (B.R.)
Gruhn, E., with Blas Ruiz & Schouten, 362 (Am.)
Guadagnini, M., (1152), 1152 (Lep.)
Guerra, A., with Hoffmann, (560) (Hel.)
Guha, P. C., with Bami, (806) *bis* (Mal.)
——, with —— & Iyer, (114) *ter*, (115) (Mal.)
Guha, P. K., 1063 (Hel.)
Guija Morales, E., (684) (B.R.)
Guillen, J. & Ibars, A., (48) (Lep.)
Guillermo Aguayo, C., 1058 (Hel.)
Guillot, C. F. & Capurro, E. T., 1053 (Lep.)
——, with ——, 640 (Lep.)
Guimaraes, F. N. & Rodrigues, B. A., 777 (Der.)
Gulland, J. M. & Macey, P. E., (807) (Mal.)
Gumble, A., with Hewitt, Kushner, Safir, Brancone & Subbarow, 1128 (Tryp.)
Gunche, F. F., Radice, J. C. & Feoli, L. S. J., (167) (Der.)
Gunn, C. S., with Gitlin & Schaffer, 751 (Hel.)
Gunnison, J. B. & Lazarus, A. S., 460 (Pl.)
Gupta, A. K. D., 35 (Pl.)
Gupta, D. C., with Chand & Ghhuttani, 126 (Leish.)
Gupta, D. M. & Chatterjee, J. R., (815) (Leish.)
Gupta, J. C., with Mullick, 520 (Mal.)
Gupta, S. K., with Panja, 34 (Pl.)
Gurkirpal Singh, with Ahuja, 38 (Chl.)
Gursch, I. F., 388, 657 (Hel.)
Gurtner, H., 1063 (Hel.)
Gutiérrez, J., with Noé, Bertin & Neghme, 1008 (Mal.)
Gutiérrez Estarlí, E., with Basnuevo, 1036 (Am.)
Gutner, L. B. & Fisher, M. W., 90 (Misc. Dis.)
Gutscher, V. & Nufer, K., 134 (Typh.)
Guy, E. G., with Pincoffs, Lister, Woodward & Smadel, 250 (Typh.)
Guytingco, A., with Cruz & Kasilag, 954 (Hel.)
Guyaux, R., (19), (448) (Tryp.)
Guzman Acosta, C., with Diaz-Rivera, Collazo & Pomales Lebron, 452 (Typh.)

H

Haas, V. H., Wilcox, A. & Coleman, N., 909 (Mal.)
——, ——, Laird, R. L., Ewing, F. M. & Coleman, N., 108 (Mal.)
Habel, K., Bell, J. F. & Wright, J. T., 733 (Rab.)
——, with —— & ——, 733 (Rab.)
——, with Wright, 459 (Rab.)
——, with —— & Bell, 732 (Rab.)
Hackett, C. J., 472 (Ys.), 932 (Y.F.)
Haddow, A. J., 172 (Ent.)
—— & Dick, G. W. A., 458 (Y.F.)
——, Smithborn, K. C., Dick, G. W. A., Kitchen, S. F. & Lumsden, W. H. R., 457 (Y.F.)
——, with —— & Lumsden, 823 (Y.F.)
Hafez, A., with Halawani, Baz & Shawarbi, 650 (Hel.)
——, with ——, Newsome & Cowper, 753 (Hel.)
Hafez, A. H., 1064 (Hel.)
Hafez, M., 404 (Ent.)
Halawani, A., (380) (Hel.), 783 (Ulc.)
——, Abdel Aziz, A. & Ashour, M., (355) (Y.F.)
——, Baz, I., Hafez, A. & Shawarbi, M. K., 650 (Hel.)
——, —— & Morcos, F., 435 (Mal.)
—— & El Kordy, M. I., 942 (Am.)
——, Hafez, A., Newsome, J. & Cowper, S. G., 753 (Hel.)
——, Nor-el-Din, G. & Shaker, M., (383)(Hel.)
——, with Watson & Abdel Azim, (380) (Hel.)
Hall, D. M. & Turner, E. E., (437) (Mal.)
Hall, R. de Z., with Ford, 504 (Reports, etc.)
v. Haller, E., 605, 1004 (Mal.)
Ham, D. L., with Bras, Rijkebüsch & Kotter, (869) (Der.)
Hamers, S. L. T. M. & Hermans, E. H., 368 (Lep.)
Hamid, A., 392 (Sp.)
Hammick, D. L., with Asquith & Williams, (15) (Mal.)
Hammon, W. McD., with Reeves & Brookman, 173 (Ent.)
Hammouda, M. & Nagi, M., 389 (Def. Dis.)
Han, T. N., 498 (Misc. Dis.)
Hance, B., 879 (Reports, etc.)
Hand, E. A. & Criswell, R. H., 765 (Hel.)
Hänel, L. & Weiss, R., 961 (Hel.)
Hanns, A. & Mugler, A., 113 *bis* (Mal.)
Hansen, E. L. & Anderson, H. H., 40 (Am.)
Hansen, N. W., with Anigstein & Whitney, 244 (Typh.)
Hao, N. D., with Massias, 433 (Mal.)
Harant, H., Lapeyssonnie, L. & Lancien, 761 (Hel.)

Harant, H., & Midrouillet, 950 (Hel.)
Harding, R. D., 549 (Ys.), 586 (Reports, etc.)
Hardy, F., with de Meillon & Thorp, 292 (Ent.)
——, with Thorp & de Meillon, 675 (Ent.)
Hardy, S. M., 725 (Typh.)
Hare, K. P., 768 (Def. Dis.)
Harington, A. L., with Gear, 1025 (Typh.)
Harley-Mason, J., (12) (Mal.)
Harmston, F. C., with Pratt & Lane, (1025) (Typh.)
Harrell, G. T. & Aikawa, J. K., 724 (Typh.)
——, Meads, M. & Stevens, K., 350 (Typh.)
Harris, A. & Reidel, L. M., 527 (Mal.)
Harris, P. N., with Henderson, Rose & Chen, 614 (Mal.)
Harris, R. H. & Mitchell, J. H., 834 (Am.)
Harrison, J. L., 245 (Typh.), 589 (Reports, etc.)
Harrison & Woodville, H. C., 256 (Pl.)
Hart, J. H., with Hart & Saracho-Lopez, 218 (Mal.)
Hart, J. W., 616 (Mal.)
——, with Frohne, 1002 (Mal.)
Hart, T. A., Hart, J. H. & Saracho-Lopez, E., 218 (Mal.)
Hartman, F. W., with Williams & Schelling, 762 (Hel.)
Hartz, P. H., 769 (Def. Dis.)
—— & van der Sar, A., 67 (Hel.)
Harvey, M., with Seneca & Henderson, 534 (Tryp.), 549 *bis* (Am.)
Harvey, S. C., (448), (714) (Tryp.)
Hashem, M., (59) (Hel.)
Hathaway, R. J., with Leffler, (115) (Mal.)
Hatori, J., with Miyao, Takei & Noda, (429) (Mal.)
Hauser, C. R., with Humphlett & Weiss, (437) (Mal.)
Hausman, R., 83, 494 (Der.)
Hawking, F., 235 (Tryp.)
——, with Blair, Meeser & Ross, 848 (Hel.)
—— & Laurie, W., 1065 (Hel.)
—— & Perry, W. L. M., 219, 334 (Mal.)
—— & Sewell, P., 386 (Hel.)
——, —— & Thurston, J. P., 156 (Hel.)
Haworth, R. D., McKenna, J. & Singh, N., (832) (Am.)
Hayakawa, K., 788 (B.R.)
Hayashi, H. & Watanabe, M., 1024 (Typh.)
Hayes, R. A., with Drake, Garman, Johnson, Kelley, Melamed & Peck, (611) (Mal.)
Hazarika, A. N., 925 (Leish.)
Hazato, H., with Tamiya, Yamamoto, Iida, Shimogo, Nishioka, Kawamura, Suzuki, Arai, Tsukamoto & Schoble, 927 (Typh.)
Heidelberger, C., with Fieser, Chang, Dauben, Heymann & Seligman, (115) (Mal.)
Heilig, R. & Sharma, G. C., 114 (Mal.)
Heintzelmann, F., with Christoffersen, (77) (Sp.)
Heisch, R. B., 237 (Tryp.), 471 (R.F.)
—— & Wilson, D. A. O., 330 (Mal.)
Hellbrügge, T., 874 (Prot.)
Helvig, R. J., with Locke, (134) (Typh.)
Hemphill, F. M., with Faust, 603 (Mal.)
Henderson, E., with Seneca & Harvey, 534 (Tryp.), 549 *bis* (Am.)
Henderson, F. G., Rose, C. L., Harris, P. N. & Chen, K. K., 614 (Mal.)
Henderson, J. M., 218 (Mal.)
Hendricks, J. R., with Larsh, 656 (Hel.)
Hendry, J. A., with Ashworth, Crowther, Curd, Richardson & Rose, (611) (Mal.)
——, with Birtwell, Curd & Rose, (216) (Mal.)
——, with Curd, Kenny, Murray & Rose, (215) (Mal.)
Heni, E. & Germer, W. D., 351 (Typh.)
Henrard, C., with van Hoof & Peel, (338) (Tryp.)
Henry, A. F. X., 903 *ter* (Mal.)
Hering, E. R. & Griffin, J. F., 443 (Mal.)
——, Patt, H. M. & Leavitt, H. J., 904 (Mal.)
Hérivaux, A. & Toumanoff, C., 357 (Pl.)
Hermans, E. H., with Hamers, 368 (Lep.)
Hernán Páez, L., with Pacheco, Urcuyo, González, Jiménez & Butts, 435 (Mal.)
Hernández Lira, P., 429 (Mal.)
Hernández Morales, P., with Maldonado, Fox & Thillet, 762 (Hel.)
——, with Suarez, Marchand, Perez Santiago & Torregrosa, 661 (Sp.)
Hernández Vargas, C. R., 1145 (Am.)
Hernberg, C. A., 1160 (Hel.)
—— & Tuomela, A., 205 (Mal.)
Herrera, G., 1053 (Lep.)
Hertig, M., 407 (Ent.)
——, with Fairchild, 582 (Ent.)
Hewitt, R., with Kenney, 654 (Hel.)
Hewitt, R. I., Gumble, A., Kushner, S., Safir, S. R., Brancone, L. M. & Subbarow, Y., 1128 (Tryp.)
——, with Oliver-Gonzalez & Santiago-Stevenson, 385 (Hel.)
Hewlett, P. S., with Plackett, (293) (Ent.)
Hey, D. H., with Bennett & Crofts, (522) (Mal.)
Heyeraas, H., (661) (Sp.)
Heymann, H. & Fieser, L. F., (115), (329) (Mal.)
——, with Fieser, (329) (Mal.)
——, with ——, Chang, Dauben, Heidelberger & Seligman, (115) (Mal.)
——, with —— & Seligman, (115) (Mal.)
Hidayat, M. A., 1058 (Hel.)
Higashi, A., with Peters, Bueding, Valk & Welch, 763 (Hel.)
Hildick-Smith, G., 1137 (Typh.)
Hill, A. B., 545 (Pl.)
Hill, A. E., with Irons, Murphy & Rich, 726 (Typh.)
Hill, E. & Amatuzio, D. S., 905 (Mal.)
Hill, E. L., with Dent & Morlan, 929 (Typh.)
—— & Morlan, H. B., 347 (Typh.)
Hill, J., with Gray, 711 (Mal.)
Hill, J. F. R., 99 (Reports, etc.)
Hill, T. S., with Overman & Wong, 801 (Mal.)
Hill, W. R., Rubenstein, A. D. & Kovacs, J., Jr., 282 (Der.)
Hillegas, A. B., with Hopkins, Ledin, Rebell & Camp, 282 (Der.)
Hilmy, I. S., with Khalil Bey, (380) (Hel.)
Himsworth, 768 (Def. Dis.)
Hingson, R. A., Johansen, F. A., Erickson, P. T., Elliott, D. E., Meyer, W. H., Fite, G. L., Wolcott, R. R. & Prejean, B. H., 51 (Lep.)

Hinman, E. H., 787 (Reports, etc.)
Hinterman, J., with Blanc, (875) (Prot.)
Hinton, M. A. C., 1194 (B.R.)
Hitchcock, D. J., 765, 949 (Hel.)
Hitchens, A. P., with Breed & Murray, 188 (B.R.)
Hitchings, G. H., with Falco, Russell & VanderWerff, 1125 (Mal.)
Hjerpe, C., with Sadusk & Freedman, 246 (Typh.)
Ho, E. A., with Hsu, 129 (Leish.)
——, —— & Li, Y., 342 (Leish.)
——, Soong, T. & Li, Y., 815 (Leish.)
Hoa, S. H., with Singer & Wei, 37, 360 (Chl.)
Hoare, C. A., 235 (Tryp.)
Hoat, O. D., 67 (Hel.)
Hochberg, S., with La Mer, 877 (Ent.)
Hocking, B., with Twinn, McDuffie & Cross, 580 (Ent.)
Hocking, K. S. & MacInnes, D. G., 209 (Mal.)
Hoecker, S., G., with Neghme & Felner, 859 (Hel.)
Hoehne, K., (323) (Mal.)
Hoeppli, R. & Feng, L. C., (1021) (Leish.)
Hoffman, J. & van Riel, J., 908 (Mal.)
Hoffmann, A., 499 (Ent.)
Hoffmann, R., 426 (Mal.)
Hoffmann, W. H. & Guerra, A., (560) (Hel.)
Hofman, M., with Marill & Bertozzi, 1153 (Hel.)
Hogben, L., 885 (B.R.)
Hoge, A., (81) (Vms.)
Hoge, A. H., with Prado, (81) (Vms.)
Hoggarth, E., with Curd, Landquist & Rose, (329) (Mal.)
Holdenried, R., with Meyer, 630 (Pl.)
Holder, T. M., with Brooks & Ward, 488 (Hel.)
Holstein, M., 410, 1186 (Ent.)
Holz, S. & Granier, M., (215) (Mal.)
Hoodless, D. W., 178 (Reports, etc.)
van Hoof, L., Henrard, C. & Peel, E., (338) (Tryp.)
——, with Peel, 7, 699 (Mal.)
Hoogstraal, H., with King, (974) (Ent.)
Hopkins, J. G., Hillegas, A. B., Ledin, R. B., Rebell, G. C., & Camp, E., 282 (Der.)
Hormann H., 696 (Mal.)
Hornby, H. E., 811 (Tryp.)
Horrenberger, R., with Sergent, Béguet & Parrot, 718 (Typh.)
——, with —— & Parrot, 539 (Typh.)
Horsfall, W. R., with Forbes, 1187 (Ent.)
—— & Porter, D. A., 1105 (Mal.)
Horton, S. H., Jr., 1087 (Misc. Dis.)
Hortopanu, with Zalman & David, 538 (Typh.)
Horwitz, B., with Lewin & Becker, 255 (Pl.)
Hottle, G. A., with Salvin, 166, 494 (Der.)
Hough, J., with Dickinson & Merritt, 291 (Ent.)
Hovanitz, W., (933) (Y.F.)
Howell, E. V., Jr., with Hunter, Shillam & Trott, 1061 (Hel.)
Hsu, K. C., 376 (Hel.), 428 (Mal.)
Hsu, T. & Ho, E. A., 129 (Leish.)
—— with —— & Li, 342 (Leish.)
Huebner, R. J., with Beck, Bell & Shaw, 454 (Typh.)
——, Jellison, W. L. & Beck, M. D., (626) (Typh.)
——, ——,—— & Wilcox, F. P., 823 (Typh.)
——, with ——, ——, Parker & Bell, 455 (Typh.)
——, with ——, Bell, Parker & Walsh, 252 (Typh.)
——, with ——, Ormsbee, Beck, Parker & Bell, 353 (Typh.)
——, with Spicknell & Terry, (457) (Typh.)
Huff, C. G., 103, 317 (Mal.)
—— & Coulston, F., 104 (Mal.)
——, with ——, 106 (Mal.)
Hughes, H. B., with Schmidt & Smith, 327 (Mal.)
Hughes, L. E., with Philip, 248 (Typh.)
Hughes, M., 873 (Misc. Dis.)
Hughes, T. P., with Perlowagora, 137 (Y.F.)
Humphlett, W. J., Weiss, M. J. & Hauser, C. R., (437) (Mal.)
Hung, S.-L. & Li, F.-P., 273 (Hel.)
Hunter, G. W., with Ingalls, McMullen & Bauman, 950 (Hel.)
——, Shillam, D. S., Trott, O. T. & Howell, E. V., Jr., 1061 (Hel.)
Husted, J. R., with Atchley, Yount, Pullman, Alving & Eichelberger, 214 (Mal.)
Hutchinson, M., with Sacktor & Granett, 175 (Ent.)

I

Ibarra Perez, R., with Oteiza & Gonzalez Prendes, 842 (Lep.)
Ibars, A., with Guillen, (48) (Lep.)
Ignacio Chala, H. J., 552 (Lep.)
d'Ignazio C. & Codeleoncini, E., 25, 450 (Typh.)
—— & Musi, P. S., 452 (Typh.)
Iida, T., with Tamiya, Hazato, Yamamoto, Shimojo, Nishioka, Kawamura, Suzuki, Arai, Tsukamoto & Schoble, 927 (Typh.)
Imhäuser, K., 29 (Typh.)
In der Beeck, M., (143) (Chl.)
India, 787, 880, 982 (Reports, etc.)
Indian Med. Gaz., 33 (Pl.)
Ingalls, J. W., Jr., with Bauman & Bennett, 270 (Hel.)
Ingalls, J. W., Jr., Hunter, G. W., McMullen, D. B. & Bauman, P. M., 950 (Hel.)
Innes, J. R., 263, 638 (Lep.)
Internat. J. Leprosy, 52 (Lep.)
Iriarte, D. R., 505 (Reports, etc.)
Irons, J. V., Murphy, J. N., Jr., Rich, A. B. & Hill A. E., 726 (Typh.)
Isaac Riaz, R., 255 (Pl.)
Ishii, N., 138, 727 (Den.), 286 (Prot.)
Itano, H. A. & Pauling, L., 865 (Haem.)
Itoh, H., with Kawamura, Fukusumi, Itoh, Takagi & Obata, 458 (Den.)
Itoh, T., with Kawamura, Fukusumi, Itoh, Takagi & Obata, 458 (Den.)
Iyengar, M. O. T., with Jafar, 109 (Mal.)
Iyer, B. H., with Bami & Guha, (114) *ter* (115) (Mal.)

J

Jackson, C. H. N., 336, 1014 (Tryp.)
Jackson, E., 99 (Reports, etc.)
Jackson, E. B., with Gauld, Schlingman, Manning, Batson & Campbell, 826 (Chl.)
——, with Smadel & Cruise, 1025 (Typh.)
——, with ——, Ley & Lewthwaite, 626 (Typh.)
Jacob, V. P., with de Burca, 11 (Mal.)
Jacoby, N. M. & Sagorin, L., 401 (Prot.)
Jadin, J., 22 (Typh.)
Jafar, M. & Iyengar, M. O. T., 109 (Mal.)
Jaffé, L., 872 (Misc. Dis.)
Jaffé, R., 269, 752 (Hel.)
——, Mayer, M. & Pifano, C., F., 756 (Hel.)
Jagadisan, T. N., (750) (Lep.)
Jaikaria, S. S., with Dharmendra, 369 (Lep.)
Jang, C. S., with Chou, 366 (Am.)
Jang, Chang-shaw, 611 (Mal.)
Janssen, P., 754 (Hel.)
Janssens, P. G., 53 (Hel.)
Janton, O. H., Bondi, A., Jr. & Sigel, M. M., 455 (Typh.)
Jaujou, 728 (Rab.)
——, with Bernard & Dounet, 736 (Pl.)
Jaujou, C. & Toumanoff, C., 315 (Mal.)
Jeanpierre, C., with Launoy, (920) (Tryp.)
——, with —— & Lagodsky, (714) (Tryp.)
Jefferson, R. N., with Singer, Robin & King, 492 (Haem.)
Jelliffe, D. B., 806 (Mal.) 1084 (Misc. Dis.)
Jellison, W. L., Bell, E. J., Huebner, R. J., Parker, R. R. & Welsh, H. H., 252 (Typh.)
——, with Brown & Knight, 352 (Typh.)
——, with Huebner & Beck, (626) (Typh.)
——, Huebner, R. J., Beck, M. D., Parker, R. R. & Bell, E. J., 455 (Typh.)
——, with ——, —— & Wilcox, 823 (Typh.)
——, Ormsbee, R., Beck, M. D., Huebner, R. J., Parker, R. R. & Bell, E. J., 353 (Typh.)
Jenkins, D. W., 176 *bis*, 877 (Ent.)
Jenkins, M., with Scott & Crawford, 775 (Haem.)
Jerace, F., 427 (Mal.)
Jervis, G. A., Burkhart, R. L. & Koprowski, H., 1142 (Rab.)
—— & Koprowski, H., 933 (Rab.)
Jeskey, H. A., with Morrison, 614 (Mal.)
Jezierski, A., with Giroud, 24 (Typh.)
Jiménez, A., with Pacheco, Urcuyo, González, Butts & Hernán Páez, 435 (Mal.)
Jiminez-Torres, C. F., with Rodriguez-Molins, Lang, Acevedo & Diaz, 558 (Hel.).
Jobbins, D. M., 441 (Mal.)
Johansen, F. A., with Erickson, 50 (Lep.)
——, with Hingson, Erickson, Elliott, Mayer, Fite, Wolcott & Prejean, 51 (Lep.)
Johansmann, R. J., with Ruchman, 403 (Ent.)
Johnson, D. W. & Derrick, E. H., 397 (Der.)
Johnson, H. N., 254 (Rab.)
Johnson, R. B., with Drake, Hayes, Garman, Kelley, Melamed & Peck, (611) (Mal.)
Johnstone, H. F., Winsche, W. E. & Smith, L. W., 877 (Ent.)
Johnstone, H. G., with Anderson, Bostick, Peña Chevarria & Packer, 1146 (Am.)
Jonchere, H., Auffret, C. & Raoult, A., 528 (Bl.)
Jones, C. M., with Gordon & Chwatt, 563 (Hel.)
Jones, H. A., with Lindquist, Knipling & Laake, (583) (Ent.)
Jones, H. L., Jr. & King, J. A., 1024 (Typh.)
——, Wetzel, F. E. & Black, B.K. (280) (Haem.)
Jones, R. F., with Clark & Bercovitz, 144 (Am.)
Jones, W. E., (255) (Rab.)
de Jong, J. C. M. & Cseh Firtos, S., (94) (Ent.)
Jonnesco, D., 731 825 (Rab.)
—— & Olaru, C., 731 (Rab.)
——, & Stamatesco, S., 1141 (Rab.)
Jope, H. M., with King, Gilchirst, Wooton, O'Brien, Quelsh, Peterson, Strangeways & Ramsay 662 (Haem.)
Jopling, W. H., 1060 (Hel.)
Jordan, K., 300 (B.R.)
Jordan, W. S., Jr., 15 (Mal.)
Jose, F. R., with Salcedo, Carrasco & Valenzuela, 390 (Def. Dis.)
Joseph, J. J., 374 (Lep.)
Josephson, E. S., with Coatney, Ruhe, Cooper & Young, 1006 (Mal.)
——, with Cooper, Ruhe & Coatney, 1111 (Mal.)
——, with ——, ——, ——, & Young, 1004 (Mal.)
——, with ——, ——, ——, ——, & Burgess 1007 (Mal.)
——, with Greenberg & Boyd, 119 (Mal.)
——, with Nadel, Taylor & Greenberg, 809 (Mal.)
——, with Ruhe, Cooper & Coatney, 1111, 1112 *bis* (Mal.)
——, with ——, ——, ——, & Young, 1005 (Mal.)
——, Taylor, D. J., Greenberg, J. & Nadel, E. M., 1011 (Mal.)
J. Trop. Med. & Hyg., 468 (Am.)
Joyeux, C., 380 (Hel.)
——, & Baer, J. G., 951 (Hel.)
Juan Puiggrós, P., 46 (Lep.)
Junior, L., 1179 (Oph.)
Juttin, P., with Coudert, 976 (Lab.)

K

Kader, M. A. & Radwan, M. H., 1177 (Oph.)
Kahn, R. L., 900 (Mal.)
—— Baribeau, B. J. & Villalon, F. T., 944 (Lep.)
Kalmbach, E. R. (501) (Ent.)
Kalra, S. L., with Browning, 722 (Typh.)
Kamal, A. M., with Messih, G. A. & Kolta, Z. (1029) (Chl.)
Kao, Y. (499) (Misc. Dis.)
Kaplan, E. & Lewis, S. R., 1076 (Haem.)
Karamchandani, P. V. & Rao, K. S., 545 (Pl.)
Kartus, S., with Spies, Garcia Lopez, Milanes, Stone, Lopez Toca & Aramburu, 1073 (Haem.)
——, with ——, Suarez, Garcia Lopez, Milanes, Stone, Lopez Toca & Aramburu, 566 (Haem.)

Kasilag, W. R., with Cruz & Guytingco, 954 (Hel.)
Kawamura, A., with Tamiya, Kazato, Yamamoto, Iida, Shimojo, Nishioka, Suzuki, Arai, Tsukamoto & Schoble, 927 (Typh.)
Kawamura, R., Fukusumi, S., Itoh, T., Itoh, H., Takagi, S. & Obata, Y., 458 (Den.)
Ke, F., Chang, H. & Liu, W., 26 (Typh.)
Keatinge, A. F. H. (1089) (Ent.)
Keele, K. D., 861 (Sp.)
Kellaway, C. H., 178 (Reports, etc.)
Kelley, G. W., with Drake, Hayes, Garman, Johnson, Melamed & Peck (611) (Mal.)
Kelley, W. H., with McCord, Switzer & Culp, 280 (Haem.)
Kelsey, F. E., with Cantrell & Geiling, 911 (Mal.)
——, with Taliaferro, 1122 (Mal.)
Kendall, S. B., 850 (Hel.)
Kenney, M. & Hewitt, R., 654 (Hel.)
Kenny, T. S., with Curd, Hendry, Murray & Rose (215) (Mal.)
Kent, D. E., with Larsh (657) (Hel.)
Kent, J. F., with Rein, Bukantz, Cooper, Ruhe & Coatney, 1107 (Mal.)
Kenyon, R. L., with Wiesner, J. A. & Kwartler, C. E., 804 (Mal.)
Kermack, W. O., with Douglas (806) (Mal.)
Kershaw, W. E., 959 (Hel.)
—— & Bertram, D. S., 69 (Hel.)
——, with Plackett, R. L., 762 (Hel.)
——, Williamson, J. & Bertram, D. S., 488 (Hel.)
Ketelslegers, J., 857 (Hel.)
Keys, A., with Taylor & Mickelsen (605) (Mal.)
Khalil Bey, M. & Hilmy, I. S. (380) (Hel.)
Kho Lien Keng, 617 (Bl.)
Kian, L. P., with Viersma, 828 (Am.)
Kiang, S. & Choa, G. H., 746 (Lep.)
Kikuth, W., with Bock, 540 (Typh.)
—— & Gönnert, R., 481 (Hel.)
—— & Mudrow-Reichenow, L., 220, 702 (Mal.)
Killough, J. H., with Levine, Garzoli & Kuntz, 56 (Hel.)
King, E. J., Gilchrist, M., Wootton, I. D. P., O'Brien, J. R. P., Jope, H. M., Quelch, P. E., Peterson, J. M., Strangeways, D. H. & Ramsay, W. N. M., 662 (Haem.)
——, with Macfarlane, Wootton & Gilchrist, 661 (Haem.)
——, Wootton, I. D. P., Donaldson, R., Sisson, R. B. & Macfarlane, R. G., 663 (Haem.)
King, F. E., Acheson, R. M. & Spensley, P. C. (114) (Mal.)
King, H. & Wright, J. (16) (Mal.)
King, J. A., with Jones, 1024 (Typh.)
King, J. C., with Singer, Robin & Jefferson, 492 (Haem.)
King, W. V. & Hoogstraal, H. (974) (Ent.)
Kini, M. G., with Rao & Subrahmanyan, 969 (Ulc.)
Kirby, K. S. (706) (Mal.)
Kirk, J. B., 1102 (B.R.)
Kirk, R., 621, 815 (Leish.)
—— & Lewis, D. J. (582) (Ent.)
——, with ——, 1088 (Ent.)
——, with Pratt & Drysdale, 1021 (Typh.)
Kirk, R. C. & Ecker, E. E., 1028 (Rab.)
Kirkaldy-Willis, W. H., 266 (Hel.)
Kirsch, E. (1079) (Der.)
Kirwan, E. W., 1190 (Reports, etc.)
Kissin, M. & Adleman, R. J., 519 (Mal.)
Kitchen, S. F., with Haddow, Smithburn, Dick & Lumsden, 457 (Y.F.)
Kleine, F. K. 1101 (B.R.)
Klopper, S., (907) (Mal.)
——, Slop, D. & Op't Land, C., 612 (Mal.)
Klopstock, A., Klopstock, E. & Rosenkranz, G., 1026 (Typh.)
Klopstock, E., with Klopstock & Rosenkranz, 1026 (Typh.)
Klose, F. & Eisentraut, M., 426 (Mal.)
Knaudt, J. A., with Payne & Sharp, 131 (Typh.)
Knibb, S. A., with Campbell & Saslaw, 396 (Der.)
Knight, A. M. & Miller, J., 940 (Am.)
Knight, L. A., with Brown & Jellison, 352 (Typh.)
Knipling, E. F., with Lindquist, Jones & Laake, (583) (Ent.)
Knisely, M. H., Bloch, E. H., Eliot, T. S. & Warner, L. 12 (Mal.)
Knoll, H., (970) (Ulc.)
Knoppers, A. T., 910 (Mal.)
Koeh, Z. S., with Chung, Lim, Chang & Wang, 434 (Mal.)
Koenigsfeld, E. G. H. & Desai, V. G., 389 (Def. Dis.)
Koenigstein, R. P., 648 (Hel.)
Kohler, C. E., 1066 (Hel.)
Koidsumi, K. & Lien, J. C., 219 (Mal.)
Kolta, Z., with Kamal & Messih, (1029) (Chl.)
Komárek, J., with Breindl, 800 (Mal.)
Komarov, A. & Goldsmit, L., 1138 (Typh.)
Komp, W. H. W., 1139 (Y.F.)
Kondi, A., with Foy, Damkas, Depanian, Lefcopoulou, Bach, Dax, Pitchford, Shiele & Langton, 316 (Mal.)
Konitzer, L., 1045 (R.F.)
Konstam, G. L. S., with Rawkins, 1035 (Am.)
Konstam, P. G., (65) (Hel.)
Koppisch, E., with Pomales Lebron, Arbona & Morales Ottero, 132 (Typh.)
Koprowski, H., 735 (Rab.)
—— & Cox, H. R., 253, 1140 (Rab.)
——, with Jervis, 933 (Rab.)
——, with —— & Burkhart, 1142 (Rab.)
Kornfeld, L., with Wolfe, 931 (Typh.)
——, with —— & Gallik, 456 (Typh.)
Koszalka, M. F., 569 (Vms.)
Kotcher, E., with Good, 625 (Typh.)
Kotter, G. F., with Bras. Rijkebüsch & Ham, (869) (Der.)
Kourí, P., 271, (649) (Hel.)
——, with Baer & Sotolongo, 952 (Hel.)
——, with Gradwohl, 296 (B.R.)
Kouwenaar, W. & Esseveld, H., 723 (Typh.)
Kovacs, J., Jr., with Hill & Rubenstein, 282 (Der.)
Kozar, Z., (1064) (Hel.)
Kraan, H., with Biilmer, 317 (Mal.)
Krakowski, I. & Edelstein, A., 835 (R.F.)

Kramer, H. M., with Pickar, 543 (Rab.)
Krapin, D. & Lovelock, F. J., 284 (Der.)
Kret, A., with Verlinde, 1028 (Rab.)
Krishnan, K. V., Smith, R. O. A., Bose, P. N., Neogy, K. N., Roy, B. K. G. & Ghosh, 719, 721 *ter* (Typh.)
Krumdieck, C. F. & Puglisevich, J. M., 160 (Def. Dis.)
Kruse, H. D., 766 (Def. Dis.)
Kryñski, S., 1135 (Typh.)
—— & Wojciechowska, S., 1022 *bis* (Typh.)
Kshatriya, K. C. & Nargund, K. S., (435) (Mal.)
Kuczynski, R. R., 508 (B.R.)
Kuhns, D. M., (1026) (Typh.)
Kuitunen-Ekbaum, E., (650) (Hel.)
——, with Brown, Cronk, de Sinner, Green & Gibbons, (488) (Hel.)
——, with Brown, Sinclair, Cronk & Clark, 376 (Hel.)
Kumar, S., with Taylor & Chhuttani, 771 (Haem.)
Kumm, H. W., 1027 (Y.F.)
Kunert, H., 1101 (B.R.)
Kuntz, R. E., with Levine, Garzoli & Killough, 56 (Hel.)
Kuo Shao Chou, Yui Huan Wen & Chang Chiang, E., 647 (Hel.)
Kushner, S., with Hewitt, Gumble, Safir, Brancone & Subbarow, 1128 (Tryp.)
Kuzma, J. F., (780) (Der.)
Kwartler, C. E., with Kenyon & Wiesner, 804 (Mal.)
Kyle, J., 413 (Reports, etc.)
Kyle, L. H., McKay, D. G. & Sparling, H. J., Jr., 383 (Hel.)

L

Laake, E. W., with Lindquist, Knipling & Jones (583) (Ent.)
Labandera-Goni, H., 619 (Tryp.)
Laboratory Animals Bureau, 981 (Reports, etc.)
Lacaz, C. da S., de Faria, J. L. & Moura, R. A. de A., (397) (Der.)
—— & de Oliveira, E., 84 (Der.)
Lachmajer, J., 1104 (Mal.)
Lackman, D. & Parker, R. R., 252, 353 (Typh.)
Lackman, D. B., with Parker & Bell, 135 (Typh.)
Ladell, W. S. S., 168, 871 (Heat Str.)
Laffargue, with Aubry & Portier, (434) (Mal.)
Lafuente, M., 844 (Hel.)
Lagodsky, H., with Launoy & Jeanpierre, (714) (Tryp.)
Lagrange, E., 958, 959 (Hel.)
Lai, S.-H., 148 (Lep.)
Laird, M., 171 (Ent.)
Laird, R. L., with Haas, Wilcox, Ewing & Coleman, 108 (Mal.)
——, with McVay & Sprunt, 1044 (Am.)
de Lajudie, P., with Floch, (1068) (Hel.), 1087 (Misc. Dis.)
Lal, R. B. & Seal, S. C., 33 (Pl.)
Lalouel, J., 1012 (Tryp.)
Lambrecht, F. L., with Zanetti, 601 (Mal.)
Lamprell, B. A., 783 (Misc. Dis.)
La Mer, V. K. & Hochberg, S., 877 (Ent.)
Lamy, L., 260 (Am.)
——, with Deschiens & Marchal, 367 (Am.)
Lamy, R., with Béquignon & Vialat, 728 (Rab.)
——, with Bussard & Béquignon, 1141 (Rab.)
Lancien, with Harant & Lapeyssonnie, 761 (Hel.)
Láncos, F. J., with Véghelyi, 1148 (Am.)
Landells, J. W., 561 (Hel.)
Landmesser, W. E., Jr., with Dickstein, Love, Wilson & Wolman, 773 (Haem.)
Landor, J. V., 73 (Def. Dis.)
Landquist, J. K., with Curd, Hoggarth & Rose, (329) (Mal.)
——, with —— & Rose, (329) (Mal.)
Lane, J. E., with Pratt & Harmston, (1025) (Typh.)
Lang, A. A., with Rodriguez-Molina, Acevedo, Jiminez-Torres & Diaz, 558 (Hel.)
Langham, R. F., 875 (Prot.)
Langton, M., with Foy, Kondi, Damkas, Depanian, Lefcopoulou, Bach, Dax, Pitchford & Shiele, 316 (Mal.)
Languillon, J., 121 (Bl.)
Lapeyssonnie, L., 533 (Tryp.)
——, with Harant & Lancien, 761 (Hel.)
——, with Le Rouzic, 919 (Tryp.)
Lapeyssonie, T. C. L., 123 (Tryp.)
Lapieza Cabral, P., with Borzone & Aizemberg, 1132 (Tryp.)
Laranja, F. S., with Dias & Pellegrino, 620 (Tryp.)
Larghero Ybarz, P., (65) (Hel.)
Larmande, A., with Toulant & Toulant, 1177 (Oph.)
Larsh, J. E., Jr. & Chaffee, E. F. 469 (Am.)
—— & Hendricks, J. R., 656 (Hel.)
—— & Kent, D. E., (657) (Hel.)
Lassman, G., with Bustos Castellanos, Cerdán Murrieta & Ortiz, 898 (Mal.)
Lassman, P., 944 (Lep.)
Latapi, F., 395 (Der.)
—— & Chevez Zamora, A., 1053 (Lep.)
Launoy, L., 337 (Tryp.)
—— & Jeanpierre, C., (920) (Tryp.)
——, Lagodsky, H. & Jeanpierre, C., (714) (Tryp.)
Laurie, W., with Hawking, 1065 (Hel.)
Lavier, Crosnier & Merle, 469 (Am.)
Lavier, G., Crosnier, R. & Merle, F., 356 (Am.)
Laws, S. G., 293 (Ent.)
Lazarescu, M., with Bruckner, 903 (Mal.)
Lazarus, A. S., with Gunnison, 460 (Pl.)
Lazarus, M., with Rogers, (486) *bis* (Hel.)
Leão, A. T. & Eichbaum, F. W., 54 (Hel.)
Leavitt, H. J., with Hering & Patt, 904 (Mal.)
Lebon, J., Choussat, H. & Choussat-Clausse, J., (520) (Mal.)
Ledin, R. B., with Hopkins, Hillegas, Rebell & Camp, 282 (Der.)
Ledo, J., with Deane, Freire & Tabosa, 331 (Mal.)
Lees, A. D. & Beament, J. W. L., (94) (Ent.)
Leeson, H. S., 516 (Mal.)
—— & Theodor, O., 10 (Mal.)
Lefcopoulou, T., with Foy, Kondi, Damkas, Depanian, Bach, Dax, Pitchford, Shiele & Langton, 316 (Mal.)
Lefebvre, P., with Crosnier, Bernier, Molinier & Besseige, 743 (Am.)

Leffler, M. T. & Hathaway, R. J., (115) (Mal.)
——, with Zaugg & Rapala, (115) (Mal.)
Lefrou, G., 816 (Leish.)
Le Gac, P., 348 (Typh.)
Legwen, W. A., with Lenert, 441 (Mal.)
Lehmann, H., 664, 966 (Haem.)
Lehoult, Y., with Boquet, 393 (Vms.)
Leibovitz, A., 413 (Lab.)
Leiper, J. W. G., 950 (Hel.)
Leite, A. S., da Luz, J. V. B. & de Meira, M. T. V., 1078 (Der.)
Lemerle, T. H., with Mackerras, 1001 (Mal.)
Lemerle, L. G. & Legwen, W. A., 441 (Mal.)
Lenert, L. G. & Legwen, W. A., 441 (Mal.)
Lennette, E. H., Clark, W. H. & Dean, B. H., 1138 (Typh.)
Leon, L. A., 166 (Der.), 177 (Lab.) 272 (Hel.), 572 (Misc. Dis.), 1017 (Tryp.)
Leon Blanco, F. & Fite, G. L., 478 (Lep.)
Leonardi, G. & Pinna, R., 1019 (Leish.)
Leonardon, with Benhamou & Albou, 903 (Mal.)
Leonards, J. R., with Skeggs, (18) (Bl.)
Leprosy in India, 943 (Lep.)
Leprosy Review, 52 (Lep.)
le Roux, P. L., 235 (Tryp.)
Le Rouzic, 922 (Tryp.)
Le Rouzic, J., 1015 (Tryp.)
—— & Lapeyssonnie, L., 919 (Tryp.)
Levavasseur, G., with Sautet, Ardoin & Vuillet, 976 (Ent.)
——, with —— & Vuillet, 976 (Ent.)
Levi Castillo, R., 1193 (B.R.)
Levi Della Vida, B., with Rita, 942 (Am.)
Levine, M. D., Garzoli, R. F., Kuntz, R. E. & Killough, J. H., 56 (Hel.)
Lewert, R. M., 334 (Mal.)
Lewin, W., Becker, B. J. P. & Horwitz, B., 255 (Pl.)
Lewis, D. J., 404, (1088) (Ent.), 523 (Mal.) 532 (Tryp.)
—— & Kirk, R., 1088 (Ent.)
——, with ——, (582) (Ent.)
Lewis, H. B., Fajans, R. S., Esterer, M. B., Shen, C. & Oliphant, M., 399 (Misc. Dis.)
Lewis, S. R., with Kaplan, 1076 (Haem.)
Lewthwaite, R., with Smadek, Jackson & Ley, 626 (Typh.)
——, with ——, Traub, Ley, Philip & Woodward, 1136 (Typh.)
——, with ——, Woodward, Ley, Philip, Traub & Savoor, 27 (Typh.)
Ley, H. L., Jr., with Smadel, Jackson & Lewthwaite, 626 (Typh.)
——, with ——, Traub, Philip, Woodward & Lewthwaite, 1136 (Typh.)
——, with ——, Woodward, Philip, Traub, Lewthwaite & Savoor, 27 (Typh.)
Li, C. H., with Chang, Tong & Chin, (466) (Am.)
Li, F. C., 60 (Hel.)
Li, F. P., with Hung, 273 (Hel.)
Li, L., with Mao, 270, 559 (Hel.)
Li, Y., with Ho & Hsu, 342 (Leish.)
——, with —— & Soong, 815 (Leish.)
Liang, S. C., 671 (Oph.)
Lie Kian Joe, 955 (Hel.)
——, with Bonne & Bras, 63 (Hel.)
Liegeois, P., Rousseau, E. & Courtois, C., 136 (Y.F.)
Lien, J.-C., with Koidsumi, 219 (Mal.)
Lieou, Y. C., 729 (Rab.)
Liljestrand, A., (448) (Tryp.)
Lilligren, B. L., with Thompson, 1036 (Am.)
——, with ——, Bayles & Bush, 446 (Mal.)
Lim, K. T., with Chung, Chang, Wang & Koeh, 434 (Mal.)
Lima Torres, A., 868 (Der.)
Limbos, P., 14 (Mal.)
Lindberg, K., 157 (Hel.), (1118) (Mal.)
Lindquist, A. W., Knipling, E. F., Jones, H. A. & Laake, E. W., (583) (Ent.)
Linduska, J. P. & Morton, F. A., 522 (Mal.)
Link, V. B., 1144 (Pl.)
Lints, H. A., with Culwell, Cooper, White & Coatney, 905 (Mal.)
——, with White, Cooper, Coatney, Culwell & Young, 906 (Mal.)
Lippelt, H. & Caselitz, F. H., 1026 (Typh.)
Lippi, M., 321 (Mal.)
Lipschitz, R., with Griffiths, 1169 (Haem.)
Lipton, M. M., with Freund & Pisani, 140 (Rab.)
Lister, L. M., with Pincoffs, Guy, Woodward & Smadel, 250 (Typh.)
Little, P., with Sampath, 714 (Tryp.)
—— & Subbarow, Y., 143 (Chl.)
Liu, W., Chang, H. & Wang, P., 24, (452) (Typh.)
——, with Ke & Chang, 26 (Typh.)
Liu, W.-T., 245 (Typh.)
Liu, Y., with Yi, Chao & Chow, 489 (Def. Dis.)
Lloyd, O. C. & Sommerville, T., 1122 (Mal.)
Locke, R. F. & Helvig, R. J., (134) (Typh.)
Lodenkämper, H., 129 (Typh.)
Löffler, W., Esselier, A. F. & Macedo, M. M., 871 (Misc. Dis.)
Loh, W. P., with Tao & Woo, 359 (Chl.)
London, I. M., Shemin, D., West, R. & Rittenberg, D., (773) (Haem.)
Lopes, E. M. R., with Ferreira, 1068 (Hel.)
Lopez, J. A., with Anzola Falcon & Gomez Marcano, 12 (Mal.)
Lopez Bustos, C., 169 (Misc. Dis.)
de Lopez Candal, J. G., with Asenjo, Freire de Guzman & Mayoral de Asenjo, 447 (Mal.)
Lopez-Monis, C., 880 (Reports, etc.)
Lopez Toca, R., with Garcia Lopez, Milanes, Aramburu & Spies, 279 (Sp.)
——, with Spies, Garcia Lopez, Milanes & Aramburu, 864 (Haem.)
——, with ——, ——, ——, Stone, Aramburu & Kartus, 1073 (Haem.)
——, with ——, Stone, Garcia Lopez, Milanes & Aramburu, 80, 1167 (Haem.)
——, with ——, Suarez, Garcia Lopez, Milanes, Stone, Aramburu & Kartus, 566 (Haem.)
Lord, K. A., 291 (Ent.)
Loughlin, E. H. & Spitz, S. H., 1152 (Hel.)
Louis-Sidney, with Caubet, Abonnenc & René-Boisneuf, 318 (Mal.)
Lourenco Marques, Mocambique, 984 (Reports, etc.)

Lourie, E. M., 235 (Tryp.)
——, with Rollo & Williamson, 118 (Mal.)
——, with Seaton, 609 (Mal.)
Love, W. E., with Dickstein, Landmesser, Wilson & Wolman, 773 (Haem.)
Lovelock, F. J., with Krapin, 284 (Der.)
Loveridge, F. G., with Blair, Meeser & Ross, 556 (Hel.)
Lowe, J., 264. (265) (Lep.)
Lozano Morales, A., 126 (Leish.), 436 (Mal.)
Lu, J., with Chung & Chow, 341 (Leish.)
Lu, W. C., with Feng, 1018 (Leish.)
Lucrezi, G., 1106 (Mal.)
Luis Carri, S., 145, (1147) (Am.)
Lumsden, W. H. R., with Haddow, Smithburn, Dick & Kitchen, 457 (Y.F.)
——, with Smithburn & Haddow, 823 (Y.F.)
Lunde, M. N., with Riedel, 962 (Hel.)
Lurie, H. I., 570 (Der.)
Luscher, M., 975 (Ent.)
Lussich, J. J., 140 (Rab.)
Luttermoser, G. W., 756 (Hel.)
—— & Castellanos, J. V., 755 (Hel.)
——, with Mayer & Pifano, 757 (Hel.)
da Luz, J. V. B., with Leite & de Meira, 1078 (Der.)
Lyon, E., 635 (Am.)

M

Macan, T. T., 210 (Mal.)
McArthur, J., (800, 909, 1002) (Mal.)
McCarten, W. G., with Griffin, 829 (Am.)
McCauley, R. H., Jr., Fay, R. W. & Simmons, S. W., 524 (Mal.)
Macchiavello, A., 291, (501) (Ent.), 354 (Bart.), (826) (Pl.)
McConnachie, E. W., with Bishop, 119 (Mal.)
McCord, W. M., Kelley, W. H., Switzer, P. K. & Culp, F. B., 280 (Haem.)
McCoubrey, A. & Mathieson, D. W., (706) (Mal.)
McCoy, G. W., 375 (Lep.)
Macdonald, A., 973 (Prot.)
Macdonald, E. M. & Tatum, A. L., 92 (Prot.)
McDougall, W. A., (461) (Pl.)
McDuffie, W. C., Sharp, J. F., Cross, H. F., Twinn, C. R. & Wilson, W. M., (1088) (Ent.)
——, with Twinn, Hocking & Cross, 580 (Ent.)
Mace, D. L., (357) (Rab.)
Macedo, M. M., with Löffler & Esselier, 871 (Misc. Dis.)
Macey, P. E., with Gulland, (907) (Mal.)
Macfarlane, R. G., with King, Wootton, Donaldson & Sisson, 663 (Haem.)
——, ——, —— & Gilchrist, M., 661 (Haem.)
McGhee, R. B., 808, 809, 912 (Mal.)
McGill, H. C., Jr., with Swartzwelder, 1034 (Am.)
McGill, R. J., (154) (Hel.)
MacGregor, R. B., 524 (Mal.), 879 (Reports, etc.)
MacInnes, D. G., with Hocking, 209 (Mal.)
Mackay, D., 498 (Misc. Dis.)
Mckay, D. G., with Sparling & Kyle, 383 (Hel.)
Mackay, M., with Wood, Garlick, Motteram, Weiden, Moore & Turner, 860 (Def. Dis.)
McKee, R. W., with Ball, Anfinsen, Cruz & Geiman, 117 (Mal.)
McKenna, J., with Haworth & Singh, (832) (Am.)
McKenzie, A., 99 (Reports, etc.), 768 (Def. Dis.)
Mackerras, I. M., with Mackerras, 406 (Ent.)
Mackerras, M. J. & Ercole, Q. N., 429, 430, 431, 700 *bis* (Mal.)
—— & Lemerle, T. H., 1001 (Mal.)
—— & Mackerras, J. M., 406 (Ent.)
Mackey, J. P., with Williams, 774 (Haem.)
Mackinnon, J. E., 1076 (Vms.)
MacLeod, C. M., with Thompson & Wagner, (280) (Haem.)
McMenemey, W. H. & Vickers, A. A., (484) (Hel.)
Macmillan, R. L., with Biggs, 489, 490 (Haem.)
McMullen, D. B., with Ingalls, Hunter & Bauman, 950 (Hel.)
McNamara, H. E., 99 (Reports, etc.)
McNamara, W. L., with Pitner & Gogolak, 60 (Hel.)
McNelly, E., with Riddell & Rempel, 93 (Ent.)
McRobert, G., 497 (Heat Str.), 768 (Def. Dis.), 1190 (Reports, etc.)
McVay, L. V., Laird, R. L. & Sprunt, D. H., 1044 (Am.)
McWilliams, J. G., with Nicholson, Gaines & Vetter, 26 (Typh.)
Madinaveitia, J. & Raventos, J., 522 (Mal.)
Madras, 116 (Mal.)
Maegraith, B., 180 (B.R.), 932 (Y. F.)
Magalhaes, A., Jr., with Coelho & Menezes, 1158 (Hel.)
de Magalhaes, O., 930 (Typh.)
—— & Rocha, A., 349, 725 (Typh.)
Magara, M., Go, K., So, K. & Akima, T., 782 (Ulc.)
Maghami, G. D., with Delpy & Rafyi, 44 (R.F.)
——, with Rafyi, 1048 (R.F.)
Mahaffy, A. F., 932 (Y. F.)
Mahony, F., with Reye, 841 (Lep.)
Maier, J., Rendtorff, R. C. & Suárez, M., 584 (Ent.)
Mainzer, F., 164, 565 (Def. Dis.)
Makari, J. G., 170 (Misc. Dis.)
Makkawi, M., with Gohar, 36 (Chl.)
Malamos, B., 1190 (Reports, etc.)
Malayan Union, 524 (Mal.)
Maldonado, J. F., (154) (Hel.)
—— & Acosta-Matienzo, J., 377 (Hel.)
——, Hernández Morales, F., Fox, I. & Thillet, C. J., 762 (Hel.)
Malhotra, S. L., 939 (Am.)
Mallik, K. L. B., 216 (Mal.)
Malmejac, R., 897 (Mal.)
Malo Juvera, F. & Ortiz Mariotte, C., (501) (Ent.)
Malonado, J. F., with Oliver-González & Santiago-Stevenson, 562 (Hel.)
Mamo, A., with Seferian, (150) (Hel.)
Manalang, C., (477) (Lep.)
Manfredi, M., 114 (Mal.)
——, with Buonomini & Sicca, 315 (Mal.)
Mankikar, D. S., with Green, 498 (Misc. Dis.)

Mann, F. G., with Noe, 112 (Mal.)
Manning, M. C., with Gauld, Schlingman, Jackson, Batson & Campbell, 826 (Chl.)
Manso-Soto, A. E. & Martínez, A., (535) (Tryp.)
Manson-Bahr, P., 57 (Hel.), 744 (Am.), 1190 (Reports, etc.)
Mansour, T. E., with Chance, 760 (Hel.)
Manwell, R. D. & Feigelson, P., 1011 (Mal.)
Mao, C. P., (486), 559 (Hel.)
—— & Li, L., 270, 559 (Hel.)
Maral, R., with Sédallian & Perrin, 1159 (Hel.)
Marchal, G., with Deschiens & Lamy, 367 (Am.)
Marchand, E. J., with Saurez, Hernandez-Morales, Perez Santiago & Torregrosa, 661 (Sp.)
Marchionni, M., 113 (Mal.)
Marco Ahuir, R., with Sanchis Bayarri, 127 (Leish.)
Maren, T. H., with Otto, 1162, 1164 (Hel.)
——, with Thetford, Otto & Brown, 68 (Hel.)
Mariani, G., (131) (Typh.)
Mariano, J., 749 (Lep.)
Marie-Suzanne, with Noel, 945 (Lep.)
Marill, F. G., Hofman, M. & Bertozzi, P., 1153 (Hel.)
Marks, E. N., (581) (Ent.)
Marot, R. J., with Armstrong & Elsdon-Dew, 831 (Am.)
Maroun, T., with Brounst, 935 (Chl.)
Marques, R. J., 1034 (Am.)
Márquez, R. N. & Vives, M. M., (578) (Misc. Dis.)
Marschall, F., with Westphal, 636 (Am.)
Marshall, P. B. & Rogers, E. W., 324 (Mal.)
Martelli, T. & Zaffino, C., 1071 (Hel.)
Martin, A. E., with Wain, (94) (Ent.)
Martin, J. D., with Trapnell & Allan, 100 (Reports, etc.)
Martin, M., with Raoult, Auffret & Tanguy, 913 (Bl.)
Martin, M. L., with Gratch & Purlia, 737 (Pl.)
Martin Mendy, R., with Crivellari, (1062) (Hel.)
Martínez, A., with Manso Soto, (535) (Tryp.)
Martinez Báez, M., 856 (Hel.)
Martinez Mujica, C., 320 (Mal.)
Martinique, 98 (Reports, etc.)
Maryon, M., with Covell, Nicol & Shute, 325, 437, 703 (Mal.)
Mason, J., with Schwartz, 966 (Haem.)
Massal, E., with Alain, Touzin & Porte, 1037 (Am.)
Massias, C. & Hao, N. D., 433 (Mal.)
Massoud, G. El D., 778 (Der.)
Mathieson, D. W., with McCoubrey, (706) (Mal.)
—— & Newbery, G., (907) (Mal.)
Mathieu, M., 87 (Ulc.)
Mathis, C. & Pons, R., 507 (B.R.)
Matsubayashi, H. & Nozawa, T., 261 (Am.)
Matsuda, K., with Svirbely, Eareckson, Pickard, Solet & Tuemmler, (676) (Ent.)
Mattingly, P. F., 697 (Mal.), 876 (Ent.), 932 (Y.F.)
Maurano, F., 678 (B.R.)
——, with Bechelli & Rotberg, 678 (B.R.)
Maurice, A., with Blanc, 836 (R.F.)
Mauritius, 516 (Mal.)
Mauss, H., (59) (Hel.)
Mauzé, J., 50 (Lep.), 171 (Ent.), 1068 (Hel.)
—— & Pilin, E., (148) (Lep.), (249) (Typh.)
——, Ruggiero, D. & Pilin, E., 249 (Typh.)
Mayer, G., with Pautrizel, 655 *bis* (Hel.)
Mayer, M., 269 (Hel.)
——, with Jaffé & Pifano, 756 (Hel.)
——, Luttermoser, G. W. & Pifano, C. F., 757 (Hel.)
—— & Pifano, C. F., 757, 758 (Hel.)
Mayoral de Asenjo, A. G., with Asenjo, Freire de Guzmán & de Lopez Candal, 447 (Mal.)
Mazzotti, L., 565, 656, 760 (Hel.)
——, with Del Carmen Núnez, (388) (Hel.)
Meads, M., with Harrell & Stevens, 350 (Typh.)
Méd. Trop. (664) (Haem.), 924 (Leish.)
Medonza, O. R., with Fernando & Rajasuriya, 161 (Def. Dis.)
Meeser, C. V., with Blair, Hawking & Ross, 848 (Hel.)
——, with ——, Loveridge & Ross, 556 (Hel.)
——, Ross, W. F. & Blair, D. M., 1153 (Hel.)
Mehta, D. R., 820 (Typh.)
Mehta, J. N., 982 (Reports, etc.)
Mehta, J. M., with Patel, 436 (Mal.)
de Meillon, B., (877) (Ent.)
——, with Golberg, (408) *bis* (Ent.)
——, Thorp, J. M. & Hardy, F., 292 (Ent.)
——, with —— & ——, 675 (Ent.)
Mein, R. M. & Rosado, P. N. S., 436 (Mal.)
Meira, J. A., 847 (Hel.)
—— & Soares, J. C. M., Jr., 949 (Hel.)
de Meira, M. T. V., with Leite & da Luz, 1078 (Der.)
——, Simões, T. S. & Nogueira, J. F. P, 208 (Mal.)
Meis, A., with Oliphant, Gordon & Parker, 457 (Typh.)
Mejamed, S., with Drake, Hayes, Garman, Johnson, Kelley & Peck, (611) (Mal.)
Meleney, H. E., with Barlow, 553 (Hel.)
——, with Moore & Yolles, 948 (Hel.)
de Mello, J. P., (1007) (Mal.)
de Mello, P. J. & Pinto, D. da S., 1120 (Mal.)
Mello, L. da S., 144 (Am.)
Mem. Acad. Sci. Ist. Bologna, 1015 (Tryp.)
Mendheim, H. & Scheid, G., 1166 (Hel.)
Menezes, H., with Coelho & Magalhaes, 1158 (Hel.)
Menjaud, J., 30 (Den.)
Menk, W., (1002) (Mal.)
Menon, P. S., with Ramalingaswami & Venkatachalam, 163 (Def. Dis.)
Merle, with Lavier & Crosnier, 469 (Am.)
Merle, F., with Crosnier & Tabusse, 695 (Mal.)
——, with Lavier & Crosnier, 365 (Am.)
Merritt, D., with Dickinson & Hough, 291 (Ent.)
Messerschmitt, J., with d'Eshougues, 924 (Leish.)
Messih, G. A., with Kamal & Kolta, (1029) (Chl.)
Metcalfe, J. W., (149) (Lep.)
Mexico, 715 (Typh.)
Meyer, K. F. & Holdenried, 630 (Pl.)
Meyer, L. M., 165 (Haem.)

Meyer, W. H., with Hingson, Johansen, Erickson, Elliott, Fite, Wolcott & Prejean, 51 (Lep.)
Mickelsen, O., with Taylor & Keys (605) (Mal.)
Micks, D. W., de Caires, P. F. & Franco, L. B., 335 (Mal.)
Midrouillet, with Harant, 950 (Hel.)
Miguel, S. & Miró, J., 843 (Lep.)
Mikhail, M. N., with Ghanem, 1030 (Chl.)
Miranes, F., with Garcia Lopez, Lopez Toca, Aramburu & Spies, 279 (Sp.)
——, with Spies, Garcia Lopez, Lopez Toca & Aramburu, 864 (Haem.)
——, with ——, ——, Stone, Lopez Toca, Aramburu & Kartus, 1073 (Haem.)
——, with ——, Stone, Garcia Lopez, Lopez Toca & Aramburu, 80, 1167 (Haem).
——, with ——, Suarez, Garcia Lopez, Stone, Lopez Toca, Aramburu & Kartsu, 566 (Haem.)
Mille, R., with Galliard, 1064 (Hel.)
Miller, J., with Knight, 940 (Am.)
Miller, M. J. & Firlotte, W. R., 635 (Am.)
Millet, A., with Seneve & Gaud, (876) (Ent.)
Minaud, P. with Raynaud & Chevrot, 902 *bis* (Mal.)
Ministry of Agriculture and Fisheries, (1089) (Ent.)
Ministry of Health, 500 (Ent.)
Ministry of Supply & Dept. Scient. & Indust. Res., 504 (Reports, etc.)
Minning, W., with Vogel, 481, 1062, 1154 (Hel.)
Minou, A., with Ansari, 170 (Prot.)
Miró, J., with Miguel, 843 (Lep.)
Mirsa, A., with Tapuler, 516, 800 (Mal.)
Mitchell, J. H., with Harris, 834 (Am.)
Mitchell, R. B. with Broore & Donaldson, 1071, (Hel.)
Mittermaier, R., 625 (Typh.)
Miyao, I., Take, H., Hatori, I. & Noda, H., (429) (Mal.)
Moe, G. K., Peralta, B. & Seevers, M. H., 607 (Mal.)
Mofidi, C., with Baltazard & Bahmanyar, 43, 44 (R.F.)
——, with ——, Seydian & Bahmanyar, 836 (R.F.)
Moggridge, J. Y., 337 (Tryp.)
Mohapatra, G. S., 433 (Mal.)
Molinier, A., with Crosmer, Bernier, Besseige & Lefebvre, 743 (Am.)
Molomut, N., with Spain & Warshaw, (242) (Tryp.)
Mom, A. M., 671 (Heat Str.)
Monnerot-Dumainet, M., 1146 (Am.)
Montalvan, C. J. A., (317), (321) (Mal.), (401) Misc. Dis.)
Monteiro, J., with de Sa, (947) (Hel.)
Montel, M. L. R., 968 (Der.), 1049 (Ys.)
Montero, E. & Uribe, V., 1033 (Am.)
Montero, O. E., with Ortuzar, 938 (Am.)
Montesinos, M., with Berti, 211 (Mal.)
Montestruc, E. 92 (Reports, etc.), 274 (Hel.), (451) (Typh.), 577 (Misc. Dis.)
Montézin, G., with Schneider, 259 (Am.)
Monthly Bull. Ministry of Health & Pub Health Lab. Service, 608 (Mal.)
de Moor, C. E., 738 (Chl.)
Moore, A., with Wood, Garlick, Motteram, Weiden, Mackay & Turner, 860 (Def. Dis.)
Moore, C. V., with Callender, Nickel & Powell, 773 (Haem.)
Moore, D. F., 670 (Oph.)
Moore, D. H., with Sarles & Dove, (584) (Ent.)
Moore, D. V., Yolles, T. K. & Meleney, H. E., 948 (Hel.)
Mooser, H., 452 (Typh.)
Morales, A. B., Ortiz, A. L. & Garcia, L. S., 1108 (Mal.)
Morales Ottero, P., with Pomales Lebron, Arbona & Koppisch, 132 (Typh.)
Morcos, F., with Halawani & Baz, 435 (Mal.)
Moreau, M. H., (869) (Der.)
Morel, P., with Roman, (154) (Hel.)
Moretti, G. F., 832 (Am.)
——, with Bonnin, (771) (Sp.)
Morgan, M. T., 932 (Y.F.)
Morlan, H. B., with Dent & Hill, 929 (Typh.)
—— H. B., with Hill, 347 (Typh.)
Morones, S., 130 (Typh.)
Morris, K. R. S. & Morris, M. G., 618 (Tryp.)
Morris, M. G., with Morris, 618 (Tryp.)
Morrison, D. B. & Jeskey, H. A., 614 (Mal.)
Morton, F. A., with Linduska, 522 (Mal.)
Morton, T. C. & Cooke, J. N. C., 243 (Leish.)
Moss, C., with Friedlander, 1176 (Der.)
da Mota, L. A. C.-R. C., 1057 (Hel.)
Motteram, R., with Wood, Garlick, Weiden, Moore, Mackay & Turner, 860 (Def. Dis.)
Moulder, J. W., 445 (Mal.)
Moulton, F. R., 590 (B.R.)
Moura, R. A. de A., with Lacaz & de Faria, (397) (Der.)
de Moura, S., with Moutinho & Grilo, 1082 (Oph.)
Mousa, A. M., with Erfan, Erfan & Deeb, 643 (Hel.)
Mouwatché, I., with de Oliveira, 291 (Ent.)
Moustardier, G., with Carrere, 538 (Typh.)
——, with Poursines, 120, 448 (Bl.)
Moutinho, H., Grilo, M. & de Moura, S., 1082 (Oph.)
Moyle, V., with Baldwin (854) (Hel.)
Mudrow-Reichenow, L., 797 (Mal.)
—— with Kikuth, 220, 702 (Mal.)
—— & Reichenow, E., 1126 (Mal.)
Mueller, J. F., with Vilter & Bean, 658 (Def. Dis.)
Muende, L., 496 (Der.)
Mugler, A., with Hanna, 113 *bis* (Mal.)
Mühlens, P. & others, 594 (B.R.)
Muir, E., 263 (Lep.)
Mukherji, N., with Dharmendra, 368 (479) (Lep.)
de Mulder, P., with Bain, 239 (Tryp.)
Mullick, K. L. B. & Gupta, J. C., 520 (Mal.)
Mulrennan, J. A., with Taylor & Thurman, 349 (Typh.)
——, with Thurman & Thurman (876) (Ent.)
Muniz, J., 125 (Tryp.)
Munteanu-Vasiliu, E., with Ciuca, Ballif, Cheiarescu & Vrabie, 322, 329 (Mal.)
Murphy, J. N., Jr., with Irons, Rich & Hill, 726 (Typh.)
Murray, A. G., with Curd, Hendry, Kenny & Rose (215) (Mal.)

Murray, E. G. D., with Breed & Hitchens, 188 (B.R.)
Murray, E. S., with Snyder, Yeomans, Zarafonetis & Wheeler, 817 (Typh.)
Murray, J. F., with Altmann, 159 (Def. Dis.)
Musi, P. S., with d'Ignazio, 452 (Typh.)
Muspratt, J. (675) (Ent.)
Müting, L., with Gärtner, 1054 (Hel.)
Myburgh, C. A. L., with Shaul (418) (Reports, etc.)

N

Nadel, E. M., with Josephson, Taylor & Greenberg, 1011 (Mal.)
——, Taylor, D., Greenberg, J. & Josephson, E. S., 809 (Mal.)
Nagaty, H. F. (946) (Hel.)
—— & Zanaty, A. F., 664 (Haem.)
Nagi, M., with Hammouda, 389 (Def. Dis.)
Nahas, S., with de Arruda, da Costa & Rosenfeld, 816 (Leish.)
Nair, C. P., 709, 1118 (Mal.)
Najib Khan (144) (Am.)
Nakamura, K., 1050 (Lep.)
Nalin, P., with Roman, 410 (Ent.)
Napier, L. E., 650 (Hel.), 768 (Def. Dis.), 1190 (Reports, etc.)
Nardone, P. M., 152 (Hel.)
Nardy, R. V., with Collins & Glasgow, 821 *bis* (Typh.)
Nargund, K. S., with Kshatriya (435) (Mal.)
——, with Patel (435) (Mal.)
Nash, T. A. M., 224, 229 (Tryp.)
Natelson, S., with Zuckerman & Zymaris, 660 (Sp.)
Nature, 338 (Tryp.)
Natvig, L. R., 287 (Ent.)
Nauck, E. G. & Weyer, F., 541, 626 (Typh.)
Neal, R. A., 470 (Am.)
Neel, J. V. (1074) (Haem.)
Neghme, A., 859 (Hel.)
——, with Noé, Bertin & Gutiérrez, 1008 (Mal.)
——, Román, J. & Sotomayor, R., 1128 (Tryp.)
——, & Román, J., 449 (Tryp.)
Neghme R., A., Faiguenbaum A., J., Pilotti A., M. & Silva Campos, R., 852, 951 (Hel.)
——, Hoecker, S., G. & Felner, P., E., 859 (Hel.)
de Negri, U., 908 (Mal.)
——, with Giovanardi & Sepulcri, 906 (Mal.)
Negroni, P., 1173 *bis*, 1174 (Der.)
—— & Briz de Negroni, C., 1175 (Der.)
——, with Carlos Radice, 571 (Der.)
——, with Cordero & Quiroga, 168 (Der.)
——, Daglio, C. A. N. & Briz de Negroni, C., 167, 1175 (Der.)
—— & Vivoli, D., 1174 (Der.)
Neill, G. A. W., 927 (Typh.)
Nelson, A. A. & Fitzhugh, O. G., (214) (Mal.)
Neogy, K. N., with Krishnan, Smith, Bose, Roy & Ghosh, 719, 721 *ter* (Typh.)
Neto, J. C. de M. F., Tôrres, A. L. & Pinto, G. F., 513 (Mal.)
Nettel, F. R., 564 (Hel.)
Neves, A. de O., 643 (Hel.)
New York Acad. Sci., 1161 (Hel.)
New York State Dept. of Health, 192 (B.R.)
Newbery, G., with Berg, (706) (Mal.)
——, with Mathieson, (907) (Mal.)
Newsome, J., with Halawani, Hafez & Cowper, 753 (Hel.)
Newton, W. L., Bennett, H. J. & Figgat, W. B., 851 (Hel.)
Ngu, D. V., with Galliard, 67 (Hel.)
Nicholls, L., 277 (Def. Dis.)
Nicholson, H. P., Gaines, T. B., McWilliams, J. G. & Vetter, M. H., 26 (Typh.)
Nickel, J. F., with Callender, Moore & Powell, 773 (Haem.)
Nicol, W. D., with Covell, Shute & Maryon, 325, 437, 703 (Mal.)
Nieto, C., V. X., with Beltrán, 806 (Mal.)
Niño, F. L., (42) (Am.), (284) (Der.)
——, with di Pietro & Costa, 968 (Der.)
Nishioka, K., with Tamiya, Hazato, Yamamoto, Iida, Shimojo, Kawamura, Suzuki, Arai, Tsukamoto & Schoble, 927 (Typh.)
Nitzulescu, J., 162 *bis* (Def. Dis.)
Niyamasena, S. G., (1058) (Hel.)
Noda, H., with Miyao, Takei & Hatori, (429) (Mal.)
Nodenot, L., 238, 917 (Tryp.)
Noé, J., Bertin, V., Gutiérrez, J. & Neghme, A., 1008 (Mal.)
—— & Mann, F. G., 112 (Mal.)
Noel, R. & Soeur Marie-Suzanne, (945) (Lep.)
Nogueira, J. F. P., with de Meira & Simões, 208 (Mal.)
Norcross, G. & Openshaw, H. T., (940) (Am.)
Nor-el-Din, G., with Halawani & Shaker, (383) (Hel.)
Norden, A., 779 (Der.)
Northern Rhodesia, 531 *ter* (Tryp.)
Novicky, R., 824 (Rab.)
Nozawa, T., with Matsubayashi, 261 (Am.)
Nufer, K., with Gutscher, 134 (Typh.)
Nuñez, V., (47) (Lep.)
Nunez Andrade, R., 394 (Der.)
Nyden, S. J., 241 (Tryp.)

O

Obata, Y., with Kawamura, Fukusumi, Itoh, Itoh & Takagi, 458 (Den.)
Obrador, S., 381 (Hel.)
O'Brien, J. P., 780 (Heat Str.)
O'Brien, J. R. P., with King, Gilchrist, Wootton, Jope, Quelch, Peterson, Strangeways & Ramsay, 662 (Haem.)
Ochsner, A., DeBakey, E. G. & Dixon, J. L., 955 (Hel.)
Oelrichs, L., with Bieling, 1022 (Typh.)
Oesterlin, M., (616) (Mal.), 1016 (Tryp.)
Ogden, L. J., with Randolph & Eads, 818 (Typh.)
Ogilvie, A. C. F., with Broughton & Wylie, 939 (Am.)
Okabayashi, A., 698 (Mal.)
Olarte, J., with Varela, Pérez-Rebelo & Roch, 719 (Typh.)
Olaru, C., with Jonnesco, 731 (Rab.)
Olifan, V. I., 8 (Mal.)

Oliphant, J. W., Gordon, D. A., Meis, A. & Parker, R. R., 457 (Typh.)
—— & Parker, R. R., 253 (Typh.)
Oliphant, M., with Lewis, Fajans, Esterer & Shen, 399 (Misc. Dis.)
de Oliveira, C. C. & Freire, F., Jr., 896 (Mal.)
de Oliveira, E., with Lacaz, 84 (Der.)
de Oliveira, P. P., 853 (Hel.)
de Oliveira, S. J. & Moussatché, L., 291 (Ent.)
Oliver-González, J. & Bueding, E., 489 (Hel.)
——, Santiago-Stevenson, D. & Hewitt, R. L, 385 (Hel.)
——, —— & Malonado, J. F., 562 (Hel.)
Olivier, G., 68 (Hel.)
Olivier, L., 482, 849 *bis* (Hel.)
Olsen, O. W., 62 (Hel.)
Omar, W. & Vassiliadis, P. C., 358 (Chl.)
Omori, N., 900 (Mal.)
Onabamiro, S. D., 885 (B.R.)
Openshaw, H. T., with Battersby, (940) *bis* (Am.)
——, with Norcross, (940) (Am.)
Op't Land, C., with Klopper & Slop, 612 (Mal.)
Ordman, B., 88 (Misc. Dis.)
Ormsbee, R., with Jellison, Beck, Huebner, Parker & Bell, 353 (Typh.)
Ortiz, A. L., with Morales & Garcia, 1108 (Mal.)
Ortiz, C., with Bustos Castellanos, Cerdán Murrieta & Lassman, 898 (Mal.)
Ortiz, I. & Pardo, L. E., 1134 (Leish.)
Ortiz, C., I., with Risquez-Iribarren, 273 (Hel.)
Ortiz Mariotte, C., 1139 (Rab.)
—— & Calderón, C., 351 (Typh.)
——, with Freeman, Varela & Plotz, 536 (Typh.)
——, with Malo Juvera, (501) (Ent.)
Ortuzar E., R. & Montero, O. E., 938 (Am.)
Osimani, J. J., 20 (Tryp.), 66 (Hel.)
Osnes, M., 244 (Leish.)
Osorio, M. T., 642 (Hel.)
Oteiza, A., Gonzalez Prendes, M. A. & Ibarra Perez, R., 842 (Lep.)
Otto, G. F. & Maren, T. H., 1162, 1164 (Hel.)
——, with Thetford, Brown & Maren, 68 (Hel.)
Ottolina, C. & Atencio, M., H., 759 (Hel.)
Ovares Arias, J. C., with Peña Chavarria, Romero López, Fallas Diaz & Castro Jenkins, 342 (Leish.)
Overman, R. R., Hill, T. S. & Wong, Y. T., 801 (Mal.)

P

Pacaud, A., 974 *bis* (Ent.)
Pacheco, O., Urcuyo, G. F., González, A., Jiménez, A., Butts, D. C. A. & Hernán Páez, L., 435 (Mal.)
Packchanian, A., 18 (Tryp.), 21 (Leish.)
Packer, H., with Anderson, Johnstone, Bostick & Pena Chevarría, 1146 (Am.)
Padrón, E., with Arenas, Espinosa & Andreu, 271 (Hel.)
Pait, C. F. & Pearson, H. E., 1142 (Rab.)
de Paiva, B.-H. C., 74 (Def. Dis.)
Pampana, E. J., 425, 443 (Mal.)
P'An, H. S., Tchan, Y. T. & Pochon, J., 1029 (Pl.)
Panaitesco, G., with Combiesco, Dumitresco, Sturdza, Botez, Popesco & Zilisteano, 929 (Typh.)
Panayotatou, A., (377) (Hel.)
Pandit, S. R., 86 (Ulc.)
Panja, G. & Gupta, S. K., 34 (Pl.)
Pantridge, J. F., 963 (Def. Dis.)
Panzer, F., with Schweigert & Sparks, (165) (Haem.)
Paoliello, A., 355 (Y.F.)
Papirmeister, B. & Bang, F. B., 55 (Hel.)
Paraense, W. L., 447, 808 (Mal.)
Pardo, L. E., with Ortiz, 1134 (Leish.)
Pardo Castello, V. & Piñeyro, R., 147 (Lep.)
Paris, C., with Chaussinand & Crougue, 372, 375 (Lep.)
Parker, A. H., 408 (Ent.)
Parker, R. R., Bell, E. J. & Lackman, D. B., 135 (Typh.)
——, Bell, E. J. & Stoenner, H. G., (541) (Typh.)
——, with —— & ——, (726) (Typh.)
——, with Jellison, Bell, Huebner & Welsh, 252 (Typh.)
——, with ——, Huebner, Beck & Bell, E. J., 455 (Typh.)
——, with ——, Ormsbee, Beck, Huebner & Bell, 353 (Typh.)
——, with Lackman, 252, 353 (Typh.)
——, with Oliphant, 253 (Typh.)
——, with —— , Gordon & Meis, 457 (Typh.)
Parmer, L. G. & Cottrill, C. W., 1035 (Am.)
Parnell, R. W., 258 (Am.)
Parr, H. C. M. & Busvine, J. R., 411 (Ent.)
Parrot, L. & Durand-Delacre, R., (499) (Ent.)
——, with Sergent, Béguet & Horrenberger, 718 (Typh.)
——, with Sergent & Horrenberger, 539 (Typh.)
Parry, C. B. W., with Vane & Walker, 326 (Mal.)
Parry, H. B., Trowell, H. C. & Berry, W. T. C., 179 (Reports, etc.)
Passmore, R., 491 (Haem.)
Patel, J. C., 166 (Haem.), (953) (Hel.)
—— & Bhende, Y. M., 864, (966) (Haem.)
—— & Mehta, J. M., 436 (Mal.)
Patel, S. R. & Nargund, K. S., (435) (Mal.)
Patel, T. B. & Rebello, J. L., 35 (Pl.)
Patrissi, T., with Canaperia, 109 (Mal.)
Patt, H. M., with Hering & Leavitt, 904 (Mal.)
Paul, H., with Cochrane, Ramanujam & Russell, 747 (Lep.)
Pauling, L., with Itano, 865 (Haem.)
Pautrizel, R. & Bailenger, J., 653 (Hel.)
—— & Mayer, G., 653 *bis* (Hel.)
Pawan, J. L., 254 (Rab.)
Payne, E. H., with Sharp, 49 (Lep.)
——, —— & Knaudt, J. A., 131 (Typh.)
Payzin, S., 352 *bis* (Typh.)
Pearson, H. E., with Pait, 1142 (Rab.)
Peck, R. M., with Drake, Hayes, Garman, Johnson, Kelley & Melamed, (611) (Mal.)
Pedroso Crucet, J., 148 (Lep.)
Peel, E. & van Hoof, L., 7, 699 (Mal.)
——, with —— & Henrard, (338) (Tryp.)
Peffly, R. L. & Gahan, J. B., 878 (Ent.)
——, with ——, Gilbert & Wilson 500 (Ent.)

Pellegrino, J., 124, 813, 1129 (Tryp.)
—— & Borrotchin, M., 620 (Tryp.)
——, with Dias, 21 (Tryp.)
——, with —— & Laranja, 620 (Tryp.)
Pellicciotta, R., 84 (Heat Str.)
Pellissier, A., with Ceccaldi, Trinquier & Arnoult, 967 (Vms.)
Pelloux, A. & Decourt, P., 814, 1131 (Tryp.), 1188 (Ent.)
Peña Chavarria, A., Ovares Arias, J. C., Romero López, A., Fallas Diaz, M. & Castro Jenkins, A., 342 (Leish.)
——, with Anderson, Johnstone, Bostick & Packer, 1146 (Am.)
Peña Garcia, B., 988 (Reports, etc.)
Penido, H. M., de Sousa, E. F. & Bezerra, F. P. G., Jr., 610 (Mal.)
——, ——, Pinto, D. B. & Bezerra, F., Jr., 332 (Mal.)
Penn, G. H., (900) (Mal.)
Peralta, B., with Moe & Seevers, 607 (Mal.)
Peralta, R., with Reyes, Barrientos, Rodriguez & Carranza Amaya, 639 (Lep.)
Pereira, H. G., Travassos, J. & Vasconceles, J. V., 1023 (Typh.)
Pereira, O., 485 (Hel.)
Perera, C. A., 1179 (Oph.)
Perez Fontana, V., 650 (Hel.)
Perez Gallardo, F. & Fox, J. P., 24 (Typh.)
Perez, G. G., with Gabaldon, 6 (Mal.)
de Pérez, J., with Ayub, (256) (Pl.)
Pérez Rebelo, R., with Akle Delgádillo, 625 (Typh.)
——, with Varela, Roch & Olarte, 719 (Typh.)
Perez Santiago, E., with Suarez, Hernandez-Morales, Marchand & Torregrosa, 661 (Sp.)
Perez-Santiago, E., with ——, Rodriguez-Molina, Torregrosa & Benitez-Gautier, 391 (Sp.)
Perlowagora, A. & Hughes, T. P., 137 (Y.F.)
Perrin, A., with Sédallian & Maral, 1159 (Hel.)
Perrin, T. L., 822 (Typh.)
Perry, W. L. M., 277 (Hel.)
——, with Hawking, 219, 334 (Mal.)
Pesigan, T. P., 152 (Hel.)
Pessôa, S. B., 595, 1191 (B.R.)
——, with Coutinho, 1058 (Hel.)
—— & Villela, F. F., 343 (Leish.)
Peta, T., 903 (Mal.)
Peters, L., Bueding, E., Valk, A. D., Jr., Higashi, A. & Welch, A. D., 763 (Hel.)
Peters, R. F., with Gray, 290 (Ent.)
Peterson, J. M., with King, Gilchrist, Wootton, O'Brien, Jope, Quelch, Strangeways & Ramsay, 662 (Haem.)
Petrie, P. W. R., 1135 (Typh.)
Petrishcheva, P. A., 535 (Leish.)
Pettman, W. E. C., 217 (Mal.)
Peuziat, Y., with Beaudiment & Brochen, 918 (Tryp.)
Peuziat, Y., with Beaudiment & Brochen, 918 (Tryp.)
Pfeffer, K. H., (625) (Typh.)
Philip, C. B., 455 (Typh.)
—— & Hughes, L. E., 248 (Typh.)
——, with Smadel, Traub, Ley, Woodward & Lewthwaite, 1136 (Typh.)
——, with ——, Woodward, Ley, Traub, Lewthwaite & Savoor, 27 (Typh.)
——, Traub, R. & Smadel, J. E., 1135 (Typh.)
Phillips, H. S., with Tillman, 649 (Hel.)
Philpot, V. B., Jr., 1076 (Vms.)
Piccioli, A., 70 (Hel.)
Pick, F., 977 (Lab.)
——, with Deschiens, 482 (Hel.) 672 (Ent.)
Pickar, D. N. & Kramer, H. M., 543 (Rab.)
Pickard, H. B., with Svirbely, Eareckson, Matsuda, Solet & Tuemmler, (676) (Ent.)
Piedrola Gil, G., (877) (Ent.)
Pieraerts, G., 1166 (Def. Dis.)
Piers, F., 569 (Der.)
di Pietro, A., Niño, F. L. & Costa, L. P., 968 (Der.)
Piette, M., with Siguier & Crosnier, 1037 (Am.)
Pifano, C. F., 268 (Hel.)
——, with Jaffé & Mayer, 756 (Hel.)
——, with Mayer, 757, 758 (Hel.)
——, with —— & Luttermoser, 757 (Hel.)
Pifano, F., 923 (Tryp.)
Pilin, E., with Mauzé, (148) (Lep.), (249) (Typh.)
——, with —— & Ruggiero, 249 (Typh.)
Pilotti, M., with Neghme, Faiguenbaum & Silva Campos, 852, 951 (Hel.)
Pincoffs, M. C., Guy, E. G., Lister, L. M., Woodward, T. E. & Smadel, J. E., 250 (Typh.)
Piñeyro, R., with Pardo Castello, 147 (Lep.)
Piñeyrua, J., with Vigil & Diez, (65) (Hel.)
Pinkerton, H., with Greiff, 246 (Typh.)
Pinna, R., with Leonardi, 1019 (Leish.)
Pinto, A. R., with Ferreira & de Almeida, 1105 (Mal.), 1127 (Tryp.)
Pinto, C., 1017 (Tryp.)
Pinto, D. B., with Penido, de Sousa & Bezerra, 332 (Mal.)
Pinto, G. F., with Neto & Torres, 513 (Mal.)
Pinto, M. R., with Fonseca & Wohlwill, 1195 (B.R.)
Pinto, O. da S., with de Mello, 1120 (Mal.)
de Pinzon, T., with de Rodaniche, 875 (Prot.)
Pipkin, A. C., 937 (Am.)
—— & Rizk, E., 845 (Hel.)
Pirazzi, R., with Biaggi, 647 (Hel.)
Piringer, W., 139 (Rab.)
Piriou, L., with Brun-Buisson, Diallo & Caille, 123 (Tryp.)
Pisani, T. M., with Freund & Lipton, 140 (Rab.)
Pitchford, J., with Foy, Kondi, Damkas, Depanian, Lefcopoulou, Bach, Dax, Shiele & Langton, 316 (Mal.)
Pitner, G., McNamara, W. L. & Gogolak, F. M., 60 (Hel.)
Pittendrigh, C. S., 320 (Mal.)
Pizzi, T., Valls, J. & Florenzano, R., 340 (Tryp.)
Plackett, R. L. & Hewlett, P. S., (293) (Ent.)
——, with Kershaw, 762 (Hel.)
Pletzity, D. F., 248 (Typh.)

Plotz, H., with Freeman, Varela & Ortiz Mariotte, 536 (Typh.)
Ployé, 212 (Mal.)
Pichon, J., with P'An & Tchan, 1029 (Pl.)
Podach, E. F., 100 (Reports, etc.)
Poindexter, H. A., 587 (Reports, etc.)
Poirier, M., with Deschiens, 851 (Hel.)
Poljakoff, A., with Ashbel, (375) (Lep.)
Pollitzer, R., 256, 934 (Pl.)
Pomales Lebrón, A., 245 (Typh.)
——, Arbona, G., Morales Cttero, P. & Koppisch, E., 132 (Typh.)
——, with Díaz-Rivera, Guzman Acosta & Collazo, 452 (Typh.)
Ponce Pinedo, A. M., 558 (Hel.)
Pons, R., with Mathis, 507 (B.R.)
Pooler, N. R., with Armstrong & Elsdon-Dew, 259 (Am.)
Popesco, C., with Combiesco, Combiesco, Dumitresco & Zarnea, 627, (931) (Typh.)
——, with ——, Dumitresco, Sturdza, Botez, Panaitesco & Zilisteano, 929 (Typh.)
Porot, M., with Colette, 607 (Mal.)
Porte, L., with Alain, Massal & Touzin, 1037 (Am.)
Porter, D. A., with Horsfall, 1105 (Mal.)
Porter, R. J., 107 (Mal.)
Portier, with Aubry & Laffargue, (434) (Mal.)
Potenza, L. & Celis Pérez, A., 284 (Der.)
Poursines, Y. & Moustardier, G., 120, 448 (Bl.)
Powell, E. O., with Callender, Nickel & Moore, 773 (Haem.)
Prado, A. & Hoge, A. R., (81) (Vms.)
Prado, F., Jr., 833 (Am.)
Prat, D., 383 (Hel.)
Prates, M., 1056 (Hel.)
Pratt, E. P., Drysdale, A. D. & Kirk, R., 1021 (Typh.)
Pratt, H. D., 318 (Mal.)
——, Lane, J. E. & Harmston, F. C., (1025) (Typh.)
Pratt-Thomas, H. R. & Switzer, P. K., 1075 (Haem.)
Prejean, B. H., with Hingson, Johansen, Erickson, Elliott, Meyer, Fite & Wolcott, 51 (Lep.)
Preuss, J., (279) (Sp.)
Previtera, A. & Bongiardo, A., 128 (Leish.)
Pridi [?Pridie], 417 (Reports, etc.)
Priest, W. M., 971 (Misc. Dis.)
Proc. Roy. Soc. Med., 235 (Tryp.)
Proffitt, J. E., with Bailey & Diercks, 348 (Typh.)
Pryor, H. B., 570 (Der.)
Przyborowski, T., 1144 (Pl.)
Puchol, J. R., with Alvarez Lowel & Rodriguez-Perez, 46 (Lep.)
——, with Alvarez Lowell & Rodriguez Perez, 1051 (Lep.)
Puello Garcia, M. J., 622 (Leish.)
Puglisevich, J. M., with Krumdieck, 160 (Def. Dis.)
Pullman, T. N., with Atchley, Yount, Husted, Alving & Eichelberger, 214 (Mal.)
Puri, I. M., (517) (Mal.)
Purlia, P. L., with Gratch & Martin, 737 (Pl.)
Puyol, L. M., with Rognoni, 114 (Mal.)

Q

Quarterman, K. D., 525 (Mal.)
Queensland, 841 (Lep.), 852 (Hel.)
Quelch, P. E., with King, Gilchrist, Wootton, O'Brien, Jope, Peterson, Strangeways & Ramsay, 662 (Haem.)
Quiroga, M. L., Negroni, P. & Cordero, A. A., 168 (Der.)

R

Rabee, A. A., (385) (Hel.)
Rabello, E. X., with Ramalho, 293 (Ent.)
Rabelo, F. E. A., 369, (369) (Lep.)
Raby, W. T., with Woodward, 249 (Typh.)
Rachou, R. G., 289 (Ent.)
——, with de Bustamante & Ferreira, 1120 (Mal.)
——, with Ferreira & de Bustamante, 1120 (Mal.)
——, Ferreira, M. O. & Ferraz, D. M., 800 (Mal.)
Radice, J. C., with Gunche & Feoli, (167) (Der.)
Radvan, I., 519 (Mal.)
Radwan, M. H., with Kader, 1177 (Oph.)
Rae, W., 932 (Y.F.)
Rafyi, A., with Delpy & Maghami, 44 (R.F.)
—— & Maghami, G. R., 1048 (R.F.)
Ragab, H. A., 710 (Mal.)
Ragab, M. M., with Zaki, 257 (Chl.)
Raghvan, P., (622) (Leish.)
Rai Chaudhuri, M. N., with Chaudhuri & Chakravarty, 610 (Mal.)
Rail, G. A., 557 (Hel.)
Raj, M. P., with Rajah & Cochrane, 370 (Lep.)
Rajah, Z. J., Raj, M. P. & Cochrane, R. G., 370 (Lep.)
Rajasuriya, P. K., with Fernando & Medonza, 161 (Def. Dis.)
Ramachandra Rao, T., with Viswanathan, 16 (Mal.)
Ramakrishnan, N., (750) (Lep.)
Ramakrishna, V., with Rao, 17 (Mal.)
Ramalho, A. C. R. & Rabello, E. X., 293 (Ent.)
Ramalingaswami, V., 389 (Def. Dis.)
——, Menon, P. S. & Venkatachalam, P. S., 163 (Def. Dis.)
Raman, T. K., 73 (Def. Dis.)
Ramanujam, K., with Cochrane, Paul & Russell, 747 (Lep.)
Ramos e Silva, J., 714 (Leish.)
Ramsay, W. N. M., with King, Gilchrist, Wootton, O'Brien, Jope, Quelch, Peterson & Strangeways, 662 (Haem.)
Ranc, A., with Sohier & Gregoire, 521 (Mal.)
Randolph, R. M., Ogden, L. J. & Eads, R. B., 818 (Typh.)
Rankine, A., 516 (Mal.)
Ransford, O. N., 285 (Ulc.)
Rao, K. S., with Karamchandani, 545 (Pl.)
Rao, T. M., (434) (Mal.)
Rao, V. R., Kini, M. G. & Subrahmanyan, K. S., 969 (Ulc.)
Rao, V. V. & Ramakrishna, V., 17 (Mal.)

Raoult, A., 336 (Bl.)
——, Auffret, C., Tanguy, F. & Martin, M., 913 (Bl.)
——, with Jonchere & Auffret, 528 (Bl.)
Rapala, R. T., with Zaugg & Leffler, (115) (Mal.)
Raper, A. B., 169 (Misc. Dis.), 665 (Haem.)
Ravelli, A., 1055 (Hel.)
Raventós, J., with Madinaveitia, 522 (Mal.)
Rawkins, M. D. & Konstam, G. L. S., 1035 (Am.)
Ray, A. P., 612 (Mal.)
Ray, S. N., with Bhattacharyya, Dutt & Bhowmik, (1089) (Ent.)
Raynaud, R., Miniconi, P. & Chevrot, L., 902 *bis* (Mal.)
Reardon, L. V. & Bartgis, I. L., 828 (Am.)
Rebell, G. C., with Hopkins, Hillegas, Ledin & Camp., 282 (Der.)
Rebello, J. L., with Patel, 35 (Pl.)
Rector, E. J., with Rector, 496 (Der.)
Rector, L. E. & Rector, E. J., 496 (Der.)
Redaelli, P. & Ciferri, R., 281 (Der.)
Reddy, D. G. & Thangavelu, M., 741 (Am.)
Reed, J. G., 987 (Reports, etc.)
Reeves, W. C., Brookman, B. & Hammon, W. McD., 173 (Ent.)
Reichenow, E., 194 (B.R.)
——, with Carini, 833 (Am.)
——, with Mudrow-Rejchenow, 1126 (Mal.)
Reid, J. A., (524), 1002 (Mal.)
Reid, J. A. G., with Crawford, 71 (Def. Dis.)
Reidel, L. M., with Harris, 527 (Mal.)
Rein, C. R., Bukantz, S. C., Kent, J. F., Cooper, W. C., Ruhe, D. S. & Coatney, G. R., 1107 (Mal.)
——, Sternberg, T. H., Dwinelle, J. H. & Sheldon, A. J., 551 (Ys.)
Remlinger & Bailly, J., 356 (Rab.)
Rempel, J. G., with Riddell & McNelly, 93 (Ent.)
René-Boisneuf, P., with Caubet, Abonnenc & Louis-Sidney, 318 (Mal.)
Rendtorff, R. C., with Maier & Suárez, 584 (Ent.)
Rés, J. F., with de Azevedo, Roque, Colaco, Cristino & Coelho, 1062 (Hel.)
Rev. Sanidad e Hig. Pública, 427 (Mal.)
Reye, E. J. & Mahony, F., 841 (Lep.)
Reyes, E., Barrientos, E., Rodriguez, J. J., Carranza Amaya, A. & Peralta, R., 639 (Lep.)
Reyes, R. V., (92) (Ent.)
Reynes, V., with Alain & Saint-Etienne, 971 (Misc. Dis.)
Riblet, L., with Weinbaum & Benedict, (872) (Misc. Dis.)
Rice, E. C., with Ross, Schienbach, Burke, Bryer & Washington, 350 (Typh.)
Rice, F. A., with Coggeshall, 706 (Mal.)
Rich, A. B., with Irons, Murphy & Hill, 726 (Typh.)
Richardson, A. P., with Fieser, (115) (Mal.)
Richardson, D. N., with Ashworth, Crowther, Curd, Hendry & Rose, (611) (Mal.)
——, with Crowther, Curd & Rose, (216) (Mal.)
Rickard, E. R., 347 (Typh.)
——, with Fox, van der Scheer & Cox, 819 (Typh.)
Rickards, A. G., 361, 468 (Am.)
Ricketts, W. E., 135 (Bart.)
Riddell, W. A., Rempel, J. G. & McNelly, E., 93 (Ent.)
Riedel, B. B., 657 (Hel.)
—— & Lunde, M. N., 962 (Hel.)
van Riel, with Hoffman, 908 (Mal.)
Riesenman, F. R., with Chang & Alston, 378 (Hel.)
Rigby, E. P., 873 (Misc. Dis.)
Rigdon, R. H., 333 (Mal.), 810 (Bl.)
——, with Ruskin, 1121 (Mal.)
Rijkebüsch, L., with Bras, Kotter & Ham, (869) (Der.)
Riley, A. & Robins, G. M., 802 (Mal.)
Rinehart, J. F., Friedman, M. & Greenberg, L. D., 1167 (Def. Dis.)
—— & Greenberg, L. D., 1167 (Def. Dis.)
Ris, H. & Fox, J. P., 928 (Typh.)
Risquez-Iribarren, R., Cordero Moreno, R. & Anduze, P. J., 1082 (Oph.)
—— & Ortiz, C., I., 273 (Hel.)
Rita, G. & Levi Della Vida, B., 942 (Am.)
Ritchie, L. S. & Davis, C., 547 (Am.)
——, with Davis, 548 (Am.)
Rittenberg, D., with London, Shemin & West, (773) (Haem.)
Ritter, F. H., 1081 (Der.)
Ritterson, A. L. & Stauber, L. A., 450 (Leish.)
Rivoalen, A., 23 (Typh.)
Rizk, E., with Pipkin, 845 (Hel.)
Ro, M., with Yokogawa, (950) (Hel.)
Roantree, W. B., 732 (Rab.)
Roberts, J. I., 432 *bis*, 606, 1104 (Mal.), 491 (Haem.), 641 (Hel.)
Robin, S., with Singer, 1168 (Haem.)
——, with ——, King & Jefferson, 492 (Haem.)
Robins, G. M., with Riley, 802 (Mal.)
Roch, E., with Varela, Pérez-Rebelo & Olarte, 719 (Typh.)
Rocha, A., with de Magalhães, 349, 725 (Typh.)
Rocha e Silva, M., Beraldo, W. T. & Rosenfeld, G., 866 (Vms.)
Rockefeller Foundation, 299 (B.R.)
Rockenmacher, M., 825 (Pl.)
Rodaniche, A., with de Rodaniche, 455 (Typh.)
de Rodaniche, E. & de Pinzon, T., 875 (Prot.)
de Rodaniche, E. C., 252 (Typh.)
—— & Rodaniche, A., 455 (Typh.)
Rodhain, J., 443 (Mal.)
Rodrigues, B. A., with Guimarães, 777 (Der.)
Rodrigues, P. M. & Travassos, J., 349 (Typh.)
Rodriguez, J. J., with Reyes, Barrientos, Carranza Amaya & Peralta, 639 (Lep.)
Rodriguez, M., J. D., (376) (Hel.)
Rodriguez López-Neyra, C., (382) (Hel.)
Rodriguez-Molina, R., Lang, A. A., Acevedo, C. E., Jimenez-Torres, C. F., with Diaz, R., 558 (Hel.)
——, with Suarez, Perez-Santiago, Torregrosa & Benitez Gautier, 391 (Sp.)
Rodriguez Perez, A. P., with Alvarez Lowell & Puchol, 1051 (Lep.)
——, Alvarez Lowel & Puchol, 46 (Lep.)
Rogers, E. W., with Marshall, 324 (Mal.)

Rogers, W. P. & Lazarus, M., (486) *bis* (Hel.)
Rognoni, M. & Puyol, L. M., 114 (Mal.)
Rollo, I. M., Williamson, J. & Lourie, E. M., 118 (Mal.)
Roman, E. & Morel, P., (154) (Hel.)
—— & Nalin, P., 410 (Ent.)
Román, J., with Neghme, 449 (Tryp.)
——, with —— & Sotomayor, 1128 (Tryp.)
Romaña, C., 534 (Tryp.)
—— & Abalos, J. W., 535 (Tryp.), 569 (Vms.), 583 (Ent.)
——, with Peña Chavarria, Ovares Arias, Fallas Diaz & Castro Jenkins, 342 (Leish.)
Roque, R. de A., with de Azevedo, Colaco, Cristino, Rés & Coelho, 1062 (Hel.)
Rosado, P. N. S., with Mein, 436 (Mal.)
Rose, C. L., with Henderson, Harris & Chen, 614 (Mal.)
Rose, F. L., with Ainley & Curd, (522) (Mal.)
——, with Ashworth, Crowther, Curd, Hendry & Richardson, (611) (Mal.)
——, with Birtwell, Curd & Hendry, (216) (Mal.)
——, with Crowther, Curd & Richardson, (216) (Mal.)
——, with Curd, Hendry, Kenny & Murray, (215) (Mal.)
——, with ——, Hoggarth & Landquist, (329) (Mal.)
——, with Gage & Scott, 338 (Tryp.)
Rosenberger, H. G., with Smith, Saito, Beard & Whiting, 1172 (Der.)
Rosenblum, H., with Fraser & Danciger, 350 (Typh.)
Rosenfeld, G., 96, (96) (Lab.)
——, with de Arruda, da Costs & Nahas, 816 (Leish.)
——, with Rocha e Silva & Beraldo, 866 (Vms.)
Rosenkranz, G., 1137 (Typh.)
——, with Klopstock & Klopstock, 1026 (Typh.)
Ross Institute Industrial Advisory Committee, 879 (Reports, etc.)
Ross, S., Schoenbach, E. B., Burke, F. G., Bryer, M. S., Rice, E. C. & Washington, J. A., 350 (Typh.)
Ross, W. F., with Blair, Hawking & Meeser, 848 (Hel.)
——, with Blair, Loveridge & Meeser, 556 (Hel.)
——, with Gelfand, 378, 846 (Hel.)
——, with Messer & Blair, 1153 (Hel.)
Ross, W. M., 71 (Hel.)
Rossell, C. S. C., 368 (Lep.)
Rotberg, A. & Bechelli, L. M., 371, (372) *bis* (Lep.), 678 (B.R.)
——, with ——, 370, (372) *bis*, 1149 (Lep.)
——, with —— & Maurano, 678 (B.R.)
——, with de Souza Campos & Bechelli, 678 (B.R.)
Roth, H., with Thorborg & Tilinius, (71) (Hel.)
Roubaud, E., (19) (Tryp.)
Rousseau, E., with Liegeois & Courtois, 136 (Y.F.)
Rousselot, R. & Duvolon-Rafin, S., 262 (R.F.)
Routh, C. F., with Barksdale, 261 (Am.)
Row, R., 264, 1054 (Lep.)
Roy, B. K. G., with Krishnan, Smith, Bose, Neogy & Ghosh, 719, 721 *ter* (Typh.)
Roy, D. N., 34 (Pl.)
Royal College of Physicians, London, Cttee. on Nomenclature of Disease, 190 (B.R.)
Royes, K., 76 (Def. Dis.)
Rubenstein, A. D., with Hill & Kovacs, 282 (Der.)
Rubin, B. A., 920, 921 (Tryp.)
Rucci, E., 1019 (Leish.)
Ruchman, I. & Johansmann, R. J., 403 (Prot.)
Ruegsegger, J. M. & Gilchrist, H., 935 (Pl.)
Ruggiero, D., with Mauzé & Pilin, 249 (Typh.)
Ruhe, D. S., with Coatney, Cooper, Josephson & Young, 1006 (Mal.)
——, Cooper, W. C., Coatney, G. R. & Josephson, E. S., 1111, 1112 *bis* (Mal.)
——, with ——, —— & ——, 1111 (Mal.)
——, ——, ——, —— & Young, M. D., 1005 (Mal.)
——, with ——, ——, —— & ——, 1004 (Mal.)
——, with ——, ——, ——, —— & Burgess, 1007 (Mal.)
Ruhe, J. S., with Furcolow, 1171 (Der.)
Ruiz Sanchez, A., with Ruiz Sanchez, 453 (Typh.)
Ruiz-Sanchez, F., with Ruiz Sanchez, A., 453 (Typh.)
Ruskin, A. & Rigdon, R. H., 1121 (Mal.)
Russ, M., with Balteanu & Voiculescu, 837 *bis* (R.F.)
Russell, D., with Cochrane, Ramanujam & Paul, 747 (Lep.)
Russell, P. B., with Falco, Hitchings & VanderWerff, 1125 (Mal.)
Ryden, F. W., with Shaffer & Frye, 634 (Am.)

S

de Sa, A. E. & Monteiro, L., (947) (Hel.)
Sabban, M. S. El., 1143 (Rab.)
Sabin, A. B. & Young, I., 629 (Den.)
Sabrosky, C. W., (876) (Ent.)
Saccà, G., 1088 (Ent.)
Sacktor, B., Hutchinson, M. & Granett, P., 175 (Ent.)
Sadusk, J. F., Jr., Hjerpe, C. & Freedman, M., 246 (Typh.)
Safir, S. R., with Hewitt, Gumble, Kushner, Brancone & Subbarow, 1128 (Tryp.)
Sagher, F. & Franco, S., 51 (Lep.)
Sagher, R., with Dostrovsky, 868 (Der.)
Saglam, T., (84) (Der.)
Sagorin, L., with Jacoby, 401 (Prot.)
Saint, C. F. M., 484 (Hel.)
Saint-Etienne, J., 964 (Sp.)
——, with Alain & Reynes, 971 (Misc. Dis.)
Saito, M. T., with Smith & Beard, 495 (Der.)
——, with ——, ——, Rosenberger & Whiting, 1172 (Der.)
Salcedo, J., Jr., Carrasco, E. O., Jose, F. R. & Valenzuela, R. C., 390 (Def. Dis.)
de Salve, A., 364 (Am.)
Salvin, S. B. & Hottle, G. A., 166, 494 (Der.)
Salzer, W., Timmler, H. & Andersag, H., (18) (Mal.)
Sampath, A. & Little, P., 714 (Tryp.)
Samuel, E., 258 (Am.)
——, with Beemer & Shedrow, 146 (Am.)

Sanchis Bayarri, V. & Marco Ahuir, R., 127 (Leish.)
Sanders, J. C., with Sanders, 323 (Mal.)
Sanders, J. P. & Sanders, J. C., 323 (Mal.)
Sandicchi, G., 436 (Mal.)
Sandosham, A. A., 11 *bis* (Mal.), (844), 857 (Hel.)
Santiago-Stevenson, D., with Oliver-Gonzalez & Hewitt, 385 (Hel.)
——, with —— & Malonado, 562 (Hel.)
Sapero, J. J., with Strode, Whayne, Williams & Snyder, 100 (Reports, etc.)
Sapin-Jaloustre, H., with Siguier & Crosnier, (744) (Am.)
Saracho-Lopez, E., with Hart & Hart, 218 (Mal.)
Sarles, M. P., Dove, W. E. & Moore, D. H., (584) (Ent.)
Sarnelli, T., 1082 (Oph.)
Sarrouy, C., Arnaud-Battandier, R. & Cabannes, R., 924 (Leish.)
Saslaw, S. & Campbell, C. C., 83, 779, 870 (Der.)
——, with ——, 869 (Der.)
——, with —— & Knibb, 396 (Der.)
Satgé, P., with Clément & Gerbeaux, 112 (Mal.)
Sati, M. H., 1133 (Leish.)
Saunders, G. M., Talmage, D. W. & Scott, V., 430 (Mal.)
Saunders, I. G., (677 (Reports, etc.)
Sautet, J., 1103 (Mal.)
——, Ardoin, R., Levavasseur, G. & Vuillet, J., 976 (Ent.)
——, Levavasseur, G. & Vuillet, J., 976 (Ent.)
Savoor, S. R., with Smadel, Woodward, Ley, Philip, Traub & Lewthwaite, 27 (Typh.)
Schäffer, S., with Gitlin & Gunn, 751 (Hel.)
Scharff, D. K., with Greenwald & Cochran, 111 (Mal.)
Scheff, G. J. & Thatcher, J. S., 619 (Tryp.)
Scheid, G., with Mendheim, 1166 (Hel.)
Schelling, V., with Williams & Hartman, 762 (Hel.)
Schenck, G. O. & Schulze-Buschoff, H., 384 (Hel.)
Scherpenhuysen, A. A., 45 (Ys.)
Schlanger, H., with Schlanger, 382 (Hel.)
Schlanger, P. M. & Schlanger, H., 382 (Hel.)
Schleyer, W. L. & Schnitzer, R. J., 915 (Tryp.)
Schlingman, A. S., with Gauld, Jackson, Manning, Batson & Campbell, 826 (Chl.)
Schmidt, L. H., Genther, C. S., Fradkin, R. & Squires, W., 709 (Mal.)
——, Hughes, H. B. & Smith, C. C., 327 (Mal.)
Schmitt, C. L., 607 (Mal.)
Schneider, J., with Bertrand-Fontaine & Fauvert, 362 (Am.)
—— & Caruana, M., 521 (Mal.)
—— & Montézin, G., 259 (Am.)
——, with Stefanopoulo, 275 (Hel.)
Schneider, R., with Doll, 326 (Mal.)
Schneller, G. H. & Smith, G. B. L., (411) (Ent.)
Schnitzer, R. J., with Schleyer, 915 (Tryp.)
Schoble, Y., with Tamiya, Hazato, Yamamoto, Iida, Shimojo, Nishioka, Kawamura, Suzuki, Arai & Tsukamoto, 927 (Typh.)
Schoenaers, F., 240, 241 (Tryp.)
Schoenbach, E. B., 539 (Typh.)
—— & Greenspan, E. M., 916 (Tryp.)
——, with Ross, Burke, Bryer, Rice & Washington, 350 (Typh.)
Schomer, A., with Bass & Berke, 780, 968 (Der.)
Schönhöfer, F., *et al.*, 988 (B.R.)
Schorr, H. C., with Cornbleet & Barsky, 865 (Haem.)
Schouten, G., with Blas Ruiz & Gruhn, 362 (Am.)
Schreiber, F. G. & Schubert, M., 754 (Hel.)
——, with —— & Goldberg, 646 (Hel.)
Schroeder, A., (382) (Hel.)
Schubert, M., Goldberg, E. & Schreiber, F. G., 646 (Hel.)
——, with Schreiber, 754 (Hel.)
Schubert, E., 384 (Hel.)
Schüffner, W., 858 (Hel.)
— & Swellengrebel, N. H., 960 (Hel.)
Schujman, S., 48, 843 (Lep.)
Schultz, K. H., 217 (Mal.)
Schulze-Buschoff, H., with Schenck, 384 (Hel.)
Schwartz, S. O. & Mason, J., 966 (Haem.)
Schweigert, B. S., with Panzer, F. & Sparks, P., (165) (Haem.)
Schwetz, J., 428 (Mal.), 593 (B.R.), 1156, 1157 (Hel.)
——, Baumann, H. & Fort, M., 897 (Mal.)
Scott, M., with Rose & Gage, 338 (Tryp.)
Scott, R. B., Crawford, R. P. & Jenkins, M., 775 (Haem.)
Scott, V., with Saunders & Talmage, 430 (Mal.)
Seal, S. C., 40 (Chl.), 934 (Pl.)
——, with Lal, 33 (Pl.)
Seaton, D. R., with Adams, 936 (Am.)
—— & Lourie, E. M., 609 (Mal.)
Sebag, A., with Dane & Corcos, 341 (Leish.)
Sédallian, P., Maral, R. & Perrin, A., 1159 (Hel.)
Seevers, M. H., with Moe & Peralta, 607 (Mal.)
Seferian, V. & Mamo, A., (150) (Hel.)
Seifter, J., with Ehrich, Alburn & Begany, 487 (Hel.)
Sekban, S. M., 91 (Misc. Dis.)
Seligman, A. M., with Fieser, Chang, Dauben, Heidelberger & Heymann, (115) (Mal.)
——, with —— & Heymann, (115) (Mal.)
Sen, N. C., 742 (Am.)
Sen, P., 745 (Lep.)
Seneca, H., Henderson, E. & Harvey, M., 534 (Tryp.), 549 *bis* (Am.)
Senevet, G., (289) *bis*, 876 (Ent.)
——, Gaud, J. & Millet, A., (876) (Ent.)
Sen Gupta, P. C., 1134 (Leish.)
Sepulcri, P., with Giovanardi & de Negri, 906 (Mal.)
—— & Mirsa, A., 516, 800 (Mal.)
Sergent, Ed., Béguet, M., Parrot, L. & Horrenberger, R., 718 (Typh.)
——, Parrot, L. & Horrenberger, R., 539 (Typh.)
—— & Sergent, Et., 448 (Mal.), 738 (Pl.), 1132 (Leish.)
Sergent, Et., 280, 493, 775, 868 (Vms.)
——, with Sergent, 448 (Mal.), 738 (Pl.), 1132 (Leish.)
Setälä. A., 1074 (Haem.)

Sewell, P., with Hawking, 386 (Hel.)
——, with —— & Thurston, 156 (Hel.)
Sexton, W. A., with Ainley (412) (Ent.)
——, with Davies, (412) Ent.)
Seydien, B., with Baltazard, Mofidi & Bahmanyar, 836 (R.F.)
Sforza, M., (696) (Mal.)
Shaffer, J. G., Ryden, F. W. & Frye, W. W., 634 (Am.)
Shaker, M., with Halawani & Nor-el-Din, (383) (Hel.)
Shanghai, 787 (Reports, etc.)
Shapiro, S., with Wroblewski & Weiner, (771) (Haem.)
Shapiro, S. K., with Browning & Dubrüle, (410) (Ent.)
——, with ——, Fraser, Glickman & Dubrüle, (410) (Ent.)
Sharif, M., 32 (Pl.)
Sharma, G. C., with Heilig, 114 (Mal.)
Sharp, E. A. & Payne, E. H., 49 (Lep.)
——, with —— & Knaudt, 131 (Typh.)
Sharp, J. F., with McDuffie, Cross, Twinn & Wilson, (1088) (Ent.)
Shaul, J. R. H. & Myburgh, C. A. L., (418) (Reports, etc.)
Shaw, E. W., with Beck, Bell & Huebner, 454 (Typh.)
Shawarbi, M. K., with Halawani, Baz & Hafez, 650 (Hel.)
Shedrow, A., with Beemer & Samuel, 146 (Am.)
Sheldon, A. J., with Rein, Sternberg & Dwinelle, 551 (Ys.)
Shelley, H. & Aziz, M., 807 (Mal.)
Shemin, D., with London, West & Rittenberg, (773) (Haem.)
Shen, C., with Lewis, Fajans, Esterer & Oliphant, 399 (Misc. Dis.)
Shen, D. S., 667 (Oph.)
Shen, S. C., Fleming, E. M. & Castle, W. B., 1074 (Haem.)
Shepard, C. C., 456 (Typh.)
Shiele, P., with Foy, Kondi, Damkas, Depanian, Lefcopoulou, Bach, Dax, Pitchford & Langton, 316 (Mal.)
Shillam, D. S., with Hunter, Trott & Howell, 1061 (Hel.)
Shillong, 86 (Ulc.)
Shimojo, H., with Tamiya, Hazato, Yamamoto, Iida, Nishioka, Kawamura, Suzuki, Arai, Tsukamoto & Schoble, 927 (Typh.)
Shoaib, S., with Talaat, 645 (Hel.)
Shookhoff, H. B. & Dwork, K. G., 1165 (Hel.)
Short, R. B., 55 (Hel.)
Short, W. F., with Cymerman, (706) (Mal.)
Shortt, H. E., 443 (Mal.)
Shousha, A. T., 438 (Mal.), 462 (Chl.), 845 (Hel.)
Shrivastava, D. L., Singh, G. & Ahuja, M. L., 827 (Chl.)
Shulov, A., 1169 (Vms.)
Shute, P. G., 7 (Mal.)
——, with Covell, Nicol & Maryon, 325, 437, 703 (Mal.)
Sicca, G. T., 911 (Mal.)
——, with Buonomini & Manfredi, 315 (Mal.)
Sigel, M. M., with Janton & Bondi, 455 (Typh.)
Siguier, F., Crosnier, J. & Sapin-Jaloustre, H. (744) (Am.)
——, Piette, M. & Crosnier, J., 1037 (Am.)
da Silva, E. M., 666 (Haem.)
da Silva, J. R., 377, 480 (Hel.)
——, with de Azevedo, Coito, Coelho & Colaço, 1056 (Hel.)
da Silva, L. C. T., 759 (Hel.)
da Silva, L. S., 761 (Hel.)
Silva Campos, R., with Neghme, Faiguenbaum & Pilotti, 852, 951 (Hel.)
Silva Peralta, P., 628 (Bart.)
Silveira, L. M., 47 (369) (Lep.)
Silver, C. P., 1061 (Hel.)
Simić, P. & Zivković, V., (675) (Mal.)
Simmons, S. W., with Fay & Buckner, 583 (Ent.)
——, with Ferguson & Upholt, 708 (Mal.)
——, with McCauley & Fay, 524 (Mal.)
Simões, T. S., with de Meira & Nogueira, 208 (Mal.)
Simons, R. D. G., 1078 (Der.)
Simons, R. D. G. P., 374 (Lep.)
Sinclair, R. G., with Brown, Cronk, Clark & Kuitunen-Ekbaum, 376 (Hel.)
Sing, K. G., 767 (Def. Dis.)
Singer, E., Wei, S. H. & Hoa, S. H., 37, 360 (Chl.)
Singer, K. & Robin, S., 1168 (Haem.)
——, —— & King, J. C. & Jefferson, R. N., 492 (Haem.)
Singh, B., 938 (Am.)
Singh, B. M., 866 (Ep. Dropsy)
Singh, D., with Afridi, 17 (Mal.)
Singh, G., with Shrivastava & Ahuja, 827 (Chl.)
Singh, J., 787 (Reports, etc.)
Singh, N., with Haworth & McKenna, (832) (Am.)
Sinha, S. B., (400) (Misc. Dis.)
Sinn, H. J., (966) (Haem.)
de Sinner, F., with Brown, Cronk, Green, Gibbons & Kuitunen-Ekbaum, (488) (Hel.)
Sippe, G., 506 (B.R.)
Sirker, M. U., 942 (Am.)
Sisson, R. B., with King, Wootton, Donaldson & Macfarlane, 663 (Haem.)
Skeggs, L. T., Jr., & Leonards, J. R., (18) (Bl.)
Skeller, E., (71) (Hel.)
Slaughter, B. I., (922) (Tryp.)
Sloan, N. R., 479 (Lep.)
Slop, D., with Klopper & Op't Land, 612 (Mal.)
Slot, G. A., (28) (Typh.)
Smadel, J. E., 453, 626 (Typh.)
——, Jackson, E. B. & Cruise, A. B., 1025 (Typh.)
——, ——, Ley, H. L., Jr. & Lewthwaite, R., 626 (Typh.)
——, with Philip & Traub, 1135 (Typh.)
——, with Pincoffs, Guy, Lister & Woodward, 250 (Typh.)
——, Traub R., Ley, H. L., Jr., Philip, C. B., Woodward, T. E. & Lewthwaite, R., 1136 (Typh.)
——, Woodward, T. E., Ley, H. L., Jr., Philip, C. B., Traub, R., Lewthwaite, R. & Savoor, S. R., 27 (Typh.)

Smart, J., 245 (Typh.), 300 (B.R.)
Smit, A. M., with Gispen & Westermann, 1024 (Typh.)
Smith, C. C., with Schmidt & Hughes, 327 (Mal.)
Smith, C. E., Beard, R. R. & Saito, M. T., 495 (Der.)
——, Saito, M. T., Beard, R. R., Rosenberger, H. G. & Whiting, E. G., 1172 (Der.)
Smith, C. H., 772 (Haem.)
Smith, C. N. & Burnett, D., Jr., (95), 1187 (Ent.)
——, Cole, M. M. & Gouck, H. K., (930) (Typh.)
Smith, D., 768 (Def. Dis.)
Smith, D. A., with Barakat, 962 (Def. Dis.)
Smith, E. A., 174 (Ent.)
Smith, G. B. L., with Schneller, (411) (Ent.)
Smith, G. W., with Chang, Riesenman & Alston,, 378 (Hel.)
Smith, H. F., Dy, F. J. & Cabrera, D. J., 612 (Mal.)
Smith, L. W., with Johnstone & Winsche, 877 (Ent.)
Smith, M., with Davey, F., 706 (Mal.)
Smith, N., with Travis, Gjullin, Blanton & Wilson, (1088) (Ent.)
Smith, P. K., with Gimble & Davison, 467 (Am.)
Smith, R. O. A., with Krishnan, Bose, Neogy, Roy & Ghosh, 719, 721 *ter* (Typh.)
Smithburn, K. C., with Dick, 542 (Y.F.)
——, with Haddow, Dick, Kitchen & Lumsden, 457 (Y.F.)
——, —— & Lumsden, W. H. R., 823 (Y.F.)
Smitskamp, H., 963 (Def. Dis.)
Smyly, H. J., 366 (Am.)
Snyder, F. M. & Cross, H. F., 540 (Typh.)
——, with ——, 820 (Typh.)
——, with ——, 540 (Typh.)
Snyder, J. C., with Bovarnick, 927 (Typh.)
——, Murray, E. S., Yeomans, A., Zarafonetis, C. J. D. & Wheeler, C. M., 817 (Typh.)
——, with Strode, Whayne, Williams & Sapero, 100 (Reports, etc.)
Soares, J. A., 53 (Lep.)
Soares, J. C. M., Jr., with Meira, 949 (Hel.)
Soflete, A., with Ciuca, Constantinesco & Teriteanu, 324 (Mal.)
Sohier, R., Gregoire, J. & Ranc. A., 521 (Mal.)
So, K., with Magara, Go & Akima, 782 (Ulc.)
Sohier, R., Gregoire, J. & Ranc, A., 521 (Mal.)
Solet, I. S., with Svirbely, Eareckson, Matsuda, Peikard & Tuemmler, (676) (Ent.)
Sommerville, T., with Lloyd, 1122 (Mal.)
Soong, T., with Ho & Li, 815 (Leish.)
Soper, F. L., 183
Sotolongo, F., with Baer & Kourí, 952 (Hel.)
Sotomayor, R., with Neghme & Román, 1128 (Tryp.)
Soulage, J., 1037 (Am.)
Soule, M. H., 590 (B.R.)
de Sousa, E. F., with Penido & Bezerra, 610 (Mal.)
——, with ——, Pinto & Bezerra, 332 (Mal.)
de Sousa, M. T. & de Almeida, L., 1020 (Leish.)
South Pacific Board of Health, 886 (B.R.)
de Souza-Araujo, H. C., (480), 750 *bis*, 1150 (Lep.)
de Souza Campos, N. & Bechelli, L. M., 681, 682 (B.R.)
——, —— & Rotberg, A., 678 (B.R.)
——, with de Souza Lima, 678 (B.R.)
de Souza Lima & others, 49 (Lep.)
Souza Lima, L. & Castro Cerqueira, G. de, 372 (Lep.)
de Souza Lima, L. & de Souza Campos, N., 678 (B.R.)
Soysa, E., 577 (Misc. Dis.)
Spain, D. M., Molomut, N. & Warshaw, L. J., (242) (Tryp.)
Spanedda, A. & Floris, M., 797 (Mal.)
Sparks, P., with Schweigert & Panzer, (165) (Haem.)
Sparling, H. J., Jr., with Kyle & McKay, 383 (Hel.)
Spensley, P. C., with King & Acheson, (114) (Mal.)
Spicknall, C. G., Terry, L. L. & Huebner, R. J., (457) (Typh.)
Spies, T. D., Garcia Lopez, G., Milanes, F., Lopez Toca, R. & Aramburu, T., 864 (Haem.)
——, with ——, ——, —— & ——, 279 (Sp.)
——, Stone, R. E., Garcia Lopez, G., Milanes, F., Lopez Toca, R. & Aramburu, T., 80 1167 (Haem.)
——, Garcia Lopez, G., Milanes, F., Stone, R. E., Lopez Toca, R., Aramburu, T. & Kartus S., 1073 (Haem.)
—— & Suarez, R. M., 391 (Sp.)
——, with Suarez, 391 (Sp.)
——, ——, Garcia Lopez, G., Milanes, F., Stone, R. E., Lopez Toca, R., Aramburu, T. & Kartus, S., 566 (Haem.)
Spingarn, C. L. & Edelman, M. H., 465 (Am.)
Spinks, A., 118 (Mal.), (813) (Tryp.)
Spitz, S. H., with Loughlin, 1152 (Hel.)
Spitzer, H., 970 (Misc. Dis.)
Sprent, J. F. A. & Chen, H. H., (854) (Hel.)
Sprunt, D. H., with McVay & Laird. 1044 (Am.)
Squires, W., with Schmidt, Genther & Fradkin, 709 (Mal.)
Stacey, G. J., with Crowther, Curd & Davey, (907) (Mal.)
——, with Curd & Davey, (907) (Mal.)
Stagg, H. E., (806) (Mal.)
Stahler, N., with Terzian & Weathersby, 909 (Mal.)
Stahlmann, W., with Thonnard-Neumann, 899 (Mal.)
Stancioli, J. & Diniz, O., 944 (Lep.)
Standen, O. D., 946 (Hel.)
Stanić M., (1076) (Vms.)
Stauber, L. A., with Ritterson, 450 (Leish.) van Steenis, P. B., 547, (742) (Am.), 606 (Mal.)
Stefanini, M., 658, 770 (Sp.)
Stefanopoulo, G. J. & Dovolon, S., 629 (Y.F.)
—— & Schneider, J., 275 (Hel.)
Stein, K. F., (962) (Hel.)
Stenburg, R. L., with Stierli, 708 (Mal.)
Sternberg, T. H., with Rein, Dwinelle & Sheldon, 551 (Ys.)

Stevens, K., with Harrell & Meads, 350 (Typh.)
Stewart, C. B., 778 (Der.)
Stewart, G. E. S., with Corkill & Creditor, 74, 75 (Def. Dis.)
Stewart, G. T., 257, 831 (Am.)
Stewart, I. S., 632 (Am.)
Steyn, J. J., 9 (Mal.)
Stierli, H. & Stenburg, R. L., 708 (Mal.)
Stitt, E. R., Clough, P. W., Branham, S. E. & contributors, 185 (B.R.)
Stoenner, H. G., with Bell & Parker, (726) (Typh.)
——, with Parker & Bell, (541) (Typh.)
Stoker, M. G. P., 26, 454 (Typh.)
Stone, R. E., with Spies, Garcia Lopez, Milanes, Lopez Toca & Aramburu, 80, 1167 (Haem.)
——, with ——, ——, ——, ——, —— & Kartus, 1073 (Haem.)
——, with ——, Suarez, Garcia Lopez, Milanes, Lopez Toca, Aramburu & Kartus, 566 (Haem.)
Strahan, J. H., 588 (Reports, etc.)
Strang, C. & Warrick, C. K., 273 (Hel.)
Strangway, A. K., with Strangway, 860 (Def. Dis.)
Strangway, W. E. & Strangway, A. K., 860 (Def. Dis.)
Strangeways, D. H., with King, Gilchrist, Wootton, O'Brien, Jope, Quelch, Peterson & Ramsay, 662 (Haem.)
Stransky, E., 1003 (Mal.)
Strauss, E. & Sulkin, S. E., 726 (Typh.)
Strode, G. K., Whayne, T. F., Williams, L. L., Jr., Sapero, J. J. & Snyder, J. C., 100 (Reports, etc.)
Strugger, S., 237 (Tryp.)
Sturdza, N., with Combiesco, Dumitresco, Botez, Ciurea & Zarnea, 931 (Typh.)
——, with ——, ——, —— Popesco, Pansitesco & Zilisteano, 929 (Typh.)
——, with ——, ——, —— & Zarnea, 931 (Typh.)
Suárez, M., with Maier & Rendtorff, 584 (Ent.)
Suarez, R. M., Perez-Santiago, E., Rodriguez-Molina, R., Torregross, M. V. & Benitez-Gautier, C., 391 (Sp.)
—— & Spies, T. D., 391 (Sp.)
——, with ——, 391 (Sp.)
——, with ——, Garcia Lopez, Milanes, Stone, Lopez Toca, Aramburu & Kartus, 566 (Haem.)
Suarez Melendez, J., (65) (Hel.)
Suarez, R. M., Hernandez-Morales, Marchand, E. J., Perez Santiago, E. & Torregrosa, M. V., 661 (Sp.)
Subbarow, Y., with Hewitt, Gumble, Kushner, Safir & Brancone, 1128 (Tryp.)
——, with Little, 143 (Chl.)
Subrahmanyan, K. S., with Rao & Kini, 969 (Ulc.)
Suhrland, L. G., with Bishop & Carpenter, 476 (Lep.)
Sulkin, S. E., with Strauss, 726 (Typh.)
Sundaram, S. K., 393 (Haem.)
Suter, R., 502 (Lab.)
Suzuki, K., with Tamiya, Hazato, Yamamoto, Iida, Shimojo, Nishioka, Kawamura, Arai, Tsukamoto & Schoble, 927 (Typh.)
Svirbely, W. J., Eareckson, W. M., Matsuda, K., Pickard, H. B., Solet, I. S. & Tuemmler, W. B., (676) (Ent.)
Swaroop, S., 697 (Mal.)
——, with Yacob, 6, 110 (Mal.)
Swartzwelder, J. C. & McGill, H. C., Jr., 1034 (Am.)
Swellengrebel, J. M. H., with Swellengrebel, 602 (Mal.)
Swellengrebel, N. H., with Schüffner, 960 (Hel.)
—— & Swellengrebel, J. M. H., 602 (Mal.)
Switzer, P. K., with McCord, Kelley & Culp, 280 (Haem.)
——, with Pratt-Thomas, 1075 (Haem.)
Symes, C. B., 289 (Ent.)

T

Taborisky, J., 667 (Oph.)
Tabosa, W., with Deane, Freire & Ledo, 331 (Mal.)
Tabusse, L., with Crosnier & Merle, 695 (Mal.)
Takagi, S., with Kawamura, Fukusumi, Itoh, Itoh & Obata,, 458 (Den.)
Takei, H., 432 (Mal.), (499) (Ent.)
——, with Miyao, Hatori & Noda, (429) (Mal.)
Talaat, S. M. & Shoaib, S., 645 (Hel.)
Taliaferro, L. G., with Taliaferro, 1122 (Mal.)
Taliaferro, W. H., 1122 (Mal.)
—— & Kelsey, F. E., 1122 (Mal.)
—— & Taliaterro, L. G., 1122 (Mal.)
Talice, R. V., 241 (Tryp.)
Talmage, D. W., with Saunders & Scott, 430 (Mal.)
Tamiya, T., Hazato, H., Yamamoto, T., Iida, T., Shimojo, H., Nishioka, K., Kawamura, A., Suzuki, K., Arai M., Tsukamoto, R. & Schoble, Y., 927 (Typh.)
Tanamal, S. J. W., 139 (Rab.)
Tanguy, F., with Auffret, 964 *bis* (Def. Dis.)
——, with Raoult, Auffret & Martin, 913 (Bl.)
Tao, S. C., Woo, M. O. & Loh, W. P., 359 (Chl.)
Tarr, L., 61 (Hel.)
Tatum, A. L., with Macdonald, 92 (Prot.)
Taylor, A. B. & Briney, A. K., 1080 (Der.)
Taylor, D. J., with Josephson, Greenberg & Nadel, 1011 (Mal.)
——, Mulrennan, J. A. & Thurman, D. C., Jr., 349 (Typh.)
(Typh.)
——, with Nadel, Greenberg & Josephson, 809 (Mal.)
Taylor, E. H., (866) (Vms.)
Taylor, G. F., Chhuttani, P. N. & Kumar, S., 771 (Haem.)
Taylor, H. L., Mickelsen, O. & Keys, A., (605) (Mal.)
Taylor, M., with Bugher, 1186 (Ent.)
Tchan, Y. T., 736 (Pl.)
——, with P'An & Pochon, 1029 (Pl.)
Teichmann, G. O., 45 (Lep.)
Teixeira, A. W. G., 94 (Ent.)
Teriteanu, N., with Ciuca, Soflete & Constantinesco, 324 (Mal.)
Terry, L. L., with Spicknall & Huebner, (457) (Typh.)

Terzian, L. A., Stahler, N. & Weathersby, A. B., 909 (Mal.)
—— & Weathersby, A. B., 609 (Mal.)
Tetzlaff, F., 1118 (Mal.)
Thangavelu, M., with Reddy, 741 (Am.)
Thatcher, J. S., with Scheff, 619 (Tryp.)
Themme, H., with Dold, 761 (Hel.)
Theodor, O., with Leeson, 10 (Mal.)
Théodoridès, J., 785 (Misc. Dis.), 1089 (Ent.)
Thetford, N. D., Otto, G. F., Brown, H. W. & Maren, T. H., 68 (Hel.)
van Thiel, P. H., with Doeleman, 314 (Mal.)
Thillet, C. J., with Maldonado, Hernández Morales & Fox, 762 (Hel.)
Thiodet, J. & Fourrier, A., 215 (Mal.)
Thompson, H. V., 141 (Pl.)
Thompson, P. E., with Bayles, A., Bush, D. L. & Lilligren, B. L., 446 (Mal.)
—— & Lilligren, B. L., 1036 (Am.)
Thompson, R. K., Wagner, J. A. & MacLeod, C. M., (280) (Haem.)
Thompson, S., 852 (Hel.)
Thomson, F. A., 768 (Def. Dis.)
Thomson, R. C. M., 439 (Mal.)
Thonnard-Neumann, E. & Stahlmann, W., 899 (Mal.)
Thorborg, N. B., Tulinius, S. & Roth, H., (71) (Hel.)
Thorp, J. M., de Meillon, B. & Hardy, F., 675 (Ent.)
——, with —— & ——, 292 (Ent.)
Thurman, D. C., Jr., Mulrennan, J. A. & Thurman, E. B., (876) (Ent.)
——, with Taylor & Mulrennan, 749 (Typh.)
Thurman, E. B., with Thurman & Mulrennan, (876) (Ent.)
Thurston, J. P., with Hawking & Sewell, 156 (Hel.)
Tidy, H., 57, 847 (Hel.), 497 (Heat Str.)
Tiliakos, M., with Doxiades, 164 (Def. Dis.)
Tillman, A. J. B. & Phillips, H. S., 649 (Hel.)
Timişescu, A., with Ciuca, Ballif, Chelaresco & Constantinesco, 321 (Mal.)
——, with ——, ——, ——, Vasiliu-Munteanu & Trofin, 329 (Mal.)
Timmler, H., with Salzer & Andersag, (18) (Mal.)
Timsit, R., with Athias & Zermati, (622) (Leish.)
Tisseuil, J., (147), 149, 745 (Lep.)
Tjiong Njan Han, 145 (Am.)
Toma, A., with Balteanu & Constantinesco, (1140) (Rab.)
Tommasino, P., with Fernandez, Carboni & Giminez, 480 (Lep.)
Tong, W. K., with Chang, Chin & Li, (466) (Am.)
Toranzos, L. B., 1000 (Mal.)
Torgersen, O., 1045 (Am.)
Torregrosa, M. V., with Suarez, Hernandez-Morales, Marchand & Perez Santiago, 661 (Sp.)
——, with ——, Perez-Santiago, Rodriguez-Molina & Benitez-Gautier, 391 (Sp.)
Tôrres, A. L., with Neto & Pinto, 513 (Mal.)
Torres Muñoz, A., (1068) (Hel.)
Toulant, M., with Toulant & Larmande, 1177 (Oph.)
Toulant, P., Larmande, A. & Toulant, M., 1177 (Oph.)
Toumanoff, C., with Hérivaux, 357 (Pl.)
——, with Jaujou, 315 (Mal.)
Touzin, R., with Alain, Massal & Porte, 1037 (Am.)
Town, B. W., Wills, E. D. & Wormall, A., 914, 1127 (Tryp.)
Trager, W., (408) (Ent.), 446 (Mal.)
Trapido, H., 411 (Ent.)
Trapnell, C. G., Martin, J. D., Allan, W. & others, 100 (Reports, etc.)
Traub, R., with Philip & Smadel, 1135 (Typh.)
——, with Smadel, Ley, Philip, Woodward & Lewthwaite, 1136 (Typh.)
——, with ——, Woodward, Ley, Philip, Lewthwaite & Savoor, 27 (Typh.)
Travassos, J., with Pereira & Vasconcelos, 1023 (Typh.)
——, with Rodrigues, 349 (Typh.)
Travis, B. V., Gjullin, C. M., Blanton, F. S., Smith, N. & Wilson, C. S., (1088) (Ent.)
Trent, S. C., 275 (Hel.)
Treviño Villaseñor, A., with De la Garza Brito, 1147 (Am.)
Trifferter, T., 130 (Typh.)
Trim, A. R., (486) (Hel.)
Trincão, C., 127, (924), 1018 *ter*, 1019 *bis* (Leish.), 1012 (Bl.), 1074 (Haem.)
Trinquier, E., with Ceccaldi, Arnoult & Pellissier, 967 (Vms.)
Tripodi, M., 466 (Am.)
Trofin, M. V., with Ciuca, Baliff, Chelaresco, Timisesco & Vasiliu-Munteanu, 329 (Mal.)
Trott, O. T., with Hunter, Shillam & Howell, 1061 (Hel.)
Trowell, H. C., 158, 389, 768 (Def. Dis.)
——, with Parry & Berry, 179 (Reports, etc.)
Tsavaris, B., (340) (Leish.)
Tsui, Y. H., with Wu, 568 (Vms.)
Tsukamoto, R., with Tamiya, Hazato, Yamamoto, Iida, Shimojo, Nishioka, Kawamura, Suzuki, Arai & Schoble, 927 (Typh.)
Tu, S., with Yang, 471 (R.F.)
Tuemmler, W. B., with Svirbely, Eareckson, Matsuda, Pickard & Solet, (676) (Ent.)
Tulinius, S., with Thorborg & Roth, (71) (Hel.)
Tunçman, Z. M., 139 (Rab.)
Tuomela, A., with Hernberg, 205 (Mal.)
Turiaf, J., Blanchon, P. & Cabail, J. L., 1183 (Misc. Dis.)
Turnbull, G. C. & Cooley, J. C., 1034 (Am.)
Turner, C. N., with Wood, Garlick, Motteram, Weiden, Moore & Mackay, 860 (Def. Dis.)
Turner, E. A., 635 (Am.)
Turner, E. E., with Hall, (437) (Mal.)
Turtz, C. A., 1081 (Oph.)
Twinn, C. R., (1088) (Ent.)
——, Hocking, B., McDuffie, W. C. & Cross, H. F., 580 (Ent.)
——, McDuffie, Sharp, Cross & Wilson (1088) (Ent.)
Tyndel, M., 90 (Misc. Dis.)

U

Uchida, S., (675) (Ent.)
Uganda Protectorate, 922 (Tryp.)
United Planting Association of Malaya, 723 (Typh.)
Upholt, W. M., with Ferguson & Simmons, 708 (Mal.)
Urcuyo, G. F., with Pacheco, González, Jiménez, Butts & Hernán Páez, 435 (Mal.)
Uribe, V., with Montero, 1033 (Am.)

V

Valenzuela, R. C., with Salcedo, Carrasco & Jose, 390 (Def. Dis.)
Valero, A., 820 (Typh.)
Valk, A. D., Jr., with Peters, Bueding, Higashi & Welsh, 763 (Hel.)
Valle, S., 1148 (Lep.)
Vallejo-Freire, A., 134 *bis* (Typh.)
Vallotton, M., 1072 (Def. Dis.)
Valls, J., with Pizzi & Florenzano, 340 (Tryp.)
van den Berghe, L., 585 (Reports, etc.)
——, with Dubois, 298, 1196 (B.R.)
van den Ende, H., 606 (Mal.)
van der Kuyp, E., 408, 675, 876, 1088 (Ent.) 698 (Mal.), 754 (Hel.)
van der Merwe, C. F., 77 (Haem.)
Vanderplank, F. L., 18, 617, 1013 *ter* (Tryp.)
van der Sar, A., 966 (Haem.)
——, with Hartz, 67 (Hel.)
van der Scheer, J., with Fox, Rickard & Cox, 819 (Typh.)
van der Walle, N., 805 (Mal.)
VanderWerff, H., with Falco, Hitchings & Russell, 1125 (Mal.)
Vane, J. R., (520) (Mal.)
——, with Burn, 326 (Mal.)
——, Walker, J. M. & Parry, C. B. W., 326 (Mal.)
Vannote, R. L., 290 (Ent.)
Varela, G., with Freeman, Plotz & Ortiz Mariotte, 536 (Typh.)
——, Pérez-Rebelo, R., Roch, E. & Olarte, J., 719 (Typh.)
Vargas, L., 70, 565, 764 (Hel.)
—— & Díaz Nájera, A., 407, (876) (Ent.)
Vargues, R., 1022 (Typh.)
——, with Giroud & Ciaccio, 717 (Typh.)
Vasconcelos, J. V., with Pereira & Travassos, 1023 (Typh.)
Vasiliu, V., with Combiesco & Dumitresco, (930) (Typh.)
Vasiliu-Munteanu, F., with Ciuca, Baliff, Chelaresco, Timisesco & Trofin, 322, 329 (Mal.)
Vassiliadis, P. C., with Omar, 358 (Chl.)
Vaughan-Jones, T., 531 *ter* (Tryp.)
Veeraraghavan, N., 740 (Chl.)
Vegas, M., Convit, J. & Espin, J., 1051 (Lep.)
Véghelyi, P. V. & Láncos, F. J., 1148 (Am.)
Velez Boza, F., 389 (Def. Dis.)
Venkatachalam, P. S., with Ramalingaswami & Menon, 169 (Def. Dis.)
Verge, M. J., 544 (Rab.)
Verlinde, J. D. & Kret, A., 1028 (Rab.)
Verner, H. D., 363 (Am.)
Vetter, M. H., with Nicholson, Gaines & McWilliams, 26 (Typh.)
Vialat, C., with Béquignon, (140), 736 (Rab.)
——, with —— & Bussard, 728 (Rab.)
——, with —— & Lamy, 729 (Rab.)
Vick, F., 672 (Heat Str.)
Vickers, A. A., with McMenemey, (484) (Hel.)
Vieria, J. R., 163 (Def. Dis.)
Viersma, H. J. & Kian, L. P., 828 (Am.)
Vigil, E., Piñeyrua, J. & Diez, R., (65) (Hel.)
Vigors Earle, G. K., 367 (R.F.)
Vilain, P., 19, 921 (Tryp.)
Vilanova, X. & Esteller, J., 478 (Lep.)
Villalon, F. T., with Kahn & Baribeau, 944 (Lep.)
Villela, F. F., with Pessôa, 343 (Leish.)
Vilter, R. W., with Bean & Blankenhorn, 1072 (Def. Dis.)
——, Mueller, J. F. & Bean, W. B., 658 (Def. Dis.)
Vint, F. W., (784) (Misc. Dis.)
Vischer, W. A., 454 (Typh.)
Viswanathan, D. K. & Bhatt, H. R., 126 (Tryp.)
—— & Ramachandra Rao, T., 16 (Mal.)
Viswanathan, R., 400 (Misc. Dis.)
Vitorrio Vanni, D., 1141 (Rab.)
Vives, M. M., with Márquez, (578) (Misc. Dis.)
Vivoli, D., with Negroni, 1174 (Der.)
Vogel, H., 192 (B.R.), 1158 (Hel.)
—— & Minning, W., 481, 1062, 1154 (Hel.)
Vogel, H. J., with Friedheim & Berman, 918 (Tryp.)
Voiculescu, M., with Balteanu & Russ, 837 *bis* (R.F.)
Vrabie, M., with Ciuca, Ballif, Chelaresco & Munteanu-Vasiliu, 322 (Mal.)
Vrzala, K., with Flusser, 18 (Bl.)
Vuillet, J., with Sautet, Ardoin & Levavasseur, 976 (Ent.)
——, with Sautet & Levavasseur, 976 (Ent.)

W

Wagle, P. M., 141 (Pl.)
—— & Bedarkar, M. K., 358 (Pl.)
Wagner, J. A., with Thompson & MacLeod, (280) (Haem.)
Wain, R. L. & Martin, A. E., (94) (Ent.)
Walker, A. J., 151 (Hel.), 518 (Mal.)
Walker, J. M., with Vane & Parry, 326 (Mal.)
Walkingshaw, R., 1071 (Hel.)
Wallace, R. B., 613, 1116 (Mal.)
Walsh, E. N., 83 (Der.)
Walton, G. A., 403 (Ent.)
Wang, P., with Liu & Chang, 24, (452) (Typh.)
Wang, W. P., with Chung, Lim, Chang & Koeh, 434 (Mal.)
Wanson, M., 387, 957, 958 (Hel.)
Ward, J. W., with Brooks & Holder, 488 (Hel.)
Ward, R. D., with Dawson & Findlay, 278 (Def. Dis.)
Warner, L., with Knisely, Bloch & Eliot, 12 (Mal.)
War Office, 701 *bis* (Mal.)
Warrick, C. K., with Strang, 273 (Hel.)

Warshaw, L. J., with Spain & Molomut, (242) (Tryp.)
Washington, 1093 (Reports, etc.)
Washington, J. A., with Ross, Schoenbach, Burke, Bryer & Rice, 350 (Typh.)
Watanabe, M., with Hayashi, 1024 (Typh.)
Waterlow, 768 (Def. Dis.)
Watson, J. M., 554 (Hel.)
——, Abdel Azim, M. & Halawani, A., (380) (Hel.)
—— & Ali Al Hamami, 846 (Hel.)
—— & Azim, M. A., 948 (Hel.)
——, with ——, 946 (Hel.)
Watts, J. C., 497 (Heat Str.)
Weathersby, A. B., with Terzian, 609 (Mal.)
——, with —— & Stahler, 909 (Mal.)
Wegmann, T., 1026 (Typh.)
Wei, S. H., with Singer & Hoa, 37, 360 (Chl.)
Weiden, S., with Wood, Garlick, Motteram, Moore, Mackey & Turner, 860 (Def. Dis.)
Weinbaum, J. G., Riblet, L. & Benedict, C. D., (872) (Misc. Dis.)
Weiner, J. S., 497 (Heat Str.)
Weiner, M., with Wroblewski & Shapiro, (771) (Haem.)
Weise, W., 616 (Bl.)
Weiss, M. J., with Humphlett & Huser, (437) (Mal.)
Weiss, P., 1170 (Der.)
Weiss, R., with Hänel, 961 (Hel.)
Welch, A. D., with Peters, Bueding, Valk & Higashi, 763 (Hel.)
Welsh, H. H., with Jellison, Bell, Huebner & Parker, 252 (Typh.)
Wender, L., 1194 (B.R.)
Wenyon, C. M., 41 (Am.)
West, J. B., 587 (Reports, etc.)
West, R., with London, Shemin & Rittenberg, (773) (Haem.)
Westermann, C. D., with Gispen & Smit, 1024 (Typh.)
Western Australia, 346 (Typh.)
Westphal, A., 546 (Am.)
—— & Marschall, F., 636 (Am.)
Wetzel, F. E., with Jones & Black, (280) (Haem).
Weyer, F., 193 (B.R.), 537, 623, 624, 627, 716, 818 (Typh.), 603 (Mal.)
——, with Nauck, 541, 626 (Typh.)
Whayne, T. F., with Strode, Williams, Sapero & Snyder, 100 (Reports, etc.)
Wheeler, C. M., with Snyder, Murray, Yeomans & Zarafonetis, 817 (Typh.)
Whitaker, H. W., Jr., 1176 (Der.)
White, J. C., with Dacie, (489) (Haem.)
White, R. S., 605 (Mal.)
White, W. C., Cooper, W. C., Coatney, G. R., Culwell, W. B., Lints, H. A. & Young M. D., 906 (Mal.)
——, with Culwell, Cooper, Lints & Coatney, 905 (Mal.)
Whiteside, E. F., 922 (Tryp.)
——, with Ford & Culwick, 122 (Tryp.)
Whiting, E. G., with Smith, Saito, Beard & Rosenberger, 1172 (Der.)
Whitney, D. M., with Anigstein & Beninson, 725 (Typh.)
——, with —— & Hansen, 244 (Typh.)
Whittick, R. J., 300 (B.R.)
Wiesner, J. A., with Kenyon & Kwartler, 804 (Mal.)
Wigand, R., 1072 (Hel.)
Wigglesworth, A., 879 (Reports, etc.)
Wigglesworth, V. B., (403) (Ent.)
Wilcox, A., with Haas & Coleman, 909 (Mal.)
——, with ——, Laird, Ewing & Coleman, 108 (Mal.)
Wilcox, F. P., with Huebner, Jellison & Beck, 823 (Typh.)
Wilde, J. K. H., (814) (Tryp.)
Wiley, J. S. & Fritz, R. F., 247 (Typh.)
Willcocks, R. G., 914 (Tryp.)
Willcox, P. H. A., 133 (Typh.)
Williams, A. W. & Mackey, J. P., 774 (Haem.)
Williams, L. L., Jr., with Strode, Whayne, Sapero & Snyder, 100 (Reports, etc.)
Williams, P. L., with Asquith & Hammick, (15) (Mal.)
Williams, R. B., 1028 (Rab.)
Williams, R. W., with Brown, 1066 (Hel.)
Williams, W. J., Schelling, V. & Hartman, F. W., 762 (Hel.)
Williamson, J., 118 (Mal.)
——, with Kershaw & Bertram, 488 (Hel.)
——, with Rollo & Lourie, 118 (Mal.)
Wills, E. D., with Town & Wormall, 914, 1127 (Tryp.)
Wilmot, A. J., with Armstrong & Elsdon-Dew, 831 (Am.)
Wilson, C. S., with Travis, Gjullin, Blanton & Smith, (1088) (Ent.)
Wilson, D. A. O., with Heisch, 330 (Mal.)
Wilson, D. B., with Garnham & Wilson, 10 (Mal.)
Wilson, H. G., with Gahan, Gilbert & Peffly, 500 (Ent.)
Wilson, M. E., with Garnham & Wilson, 10 (Mal.)
Wilson, S. G., 292 (Ent.), 919 (Tryp.)
Wilson, T., 274 (Hel.)
Wilson, T. H., with Dickstein, Landmesser, Love & Wolman, 773 (Haem.)
Wilson, W. M., with McDuffie, Sharp, Cross & Twinn, (1088) (Ent.)
Winckel, C. W. F., 13, (15), (114), 904 (Mal.)
Wingstrand, K. G., 615 *bis* (Mal.)
Winsche, W. E., with Johnstone & Smith, 877 (Ent.)
de Wit, J. C., 656 (Hel.)
Wohlwill, F., with Fonseca & Pinto, 1195 (B.R.)
Wojciechowska, S., with Kryński, 1022 *bis* (Typh.)
Wolcott, B. R., with Hingson, Johansen, Erickson, Elliott, Meyer, Fite & Prejean, 51 (Lep.)
Wolfe, D. M. & Kornfeld, L., 931 (Typh.)
—— & ——, with Gallik, L., 456 (Typh.)
Wolff, J. W., 96 (Lab.)
Wolman, I. J., with Dickstein, Landmesser, Love & Wilson, 773 (Haem.)
Wong, W. W., 1177 (Oph.)
Wong, Y. T., with Overman & Hill, 801 (Mal.)
Woo, M. O., with Tao & Loh, 359 (Chl.)
Wood, E. A., (379) (Hel.)
Wood, F. D., (70) (Hel.)

Wood, I. J., Garlick, H. W., Motteram, R., Weiden, S., Moore, A., Mackay, M. & Turner, C. N., 860 (Def. Dis.)
Wood, S. F., 619 (Tryp.)
Woodman, H. M., 956 (Hel.)
Woodruff, A. W., 965 (Sp.)
Woodville, H. C., with Harrison, 256 (Pl.)
Woodward, T. E., with Pincoffs, Guy, Lister & Smadel, 250 (Typh.)
—— & Raby, W. T., 249 (Typh.)
——, with Smadel, Ley, Philip, Traub, Lewthwaite & Savoor, 27 (Typh.)
——, with ——, Traub, Ley, Philip & Lewthwaite, 1136 (Typh.)
Wootton, I. D. P., with King, Donaldson, Sisson & Macfarlane, 663 (Haem.)
——, with ——, Gilchrist, O'Brien, Jope, Quelch, Peterson, Strangeways & Ramsay, 662 (Haem.)
——, with Macfarlane, King & Gilchrist, 661 (Haem.)
World Health Organization, 1092 (Reports etc.)
Wormall, A., with Dewey, 337 (Tryp.)
——, with Town & Wills, 914, 1127 (Tryp.)
Wright, J., with King, (16) (Mal.)
Wright, J. T., Bell, J. F. & Habel, K., 732 (Rab.)
——, with —— & ——, 733 (Rab.)
—— & Habel, K., 459 (Rab.)
——, with —— & Bell, 733 (Rab.)
Wroblewski, F., Weiner, M. & Shapiro, S., (771) (Haem.)
Wu, D. C., with Best, 648 (Hel.)
Wu, Y. K. & Tsui, Y. H., 568 (Vms.)
Wygodzinsky, P., (877) (Ent.)
Wylie, W. D., with Broughton & Ogilvie, 939 (Am.)

X

Xhaard, 242 (Leish.)

Y

Yacob, M. & Swaroop, S., 6, 110 (Mal.)
Yamamoto, T., with Tamiya, Hazato, Iida, Shimojo, Nishioka, Kawamura, Suzuki, Arai, Tsukamoto & Schoble, 927 (Typh.)
Yang, R. Y. & Tu, S., 471 (R.F.)
Yao, Y. T., 602 (Mal.)
Yaoi, H. & Arakawa, S., 137 (Den.)
Yčas, J., (751) (Lep.)
Yeomans, A., with Snyder, Murray, Zarafonetis & Wheeler, 817 (Typh.)
Yi, C., Chao, H., Chow, Y. & Liu, Y., 489 (Def. Dis.)
Yokogawa, S. & Ro, M., (950) (Hel.)
Yolles, T. K., with Moore & Meleney, 948 (Hel.)
Young, D. A., Jr., (94) (Ent.)
Young, I., with Sabin, 629 (Den.)
Young, M. D., with Coatney, Ruhe, Cooper & Josephson, 1006 (Mal.)
——, with Cooper, Ruhe, Coatney & Josephson, 1004 (Mal.)
——, with ——, ——, ——, —— & Burgess, 1007 (Mal.)
——, with Ruhe, Cooper, Coatney & Josephson, 1005 (Mal.)
——, Eyles, D. E. & Burgess, R. W., 322 (Mal.)
——, with White, Cooper, Coatney, Culwell & Lints, 906 (Mal.)
Yount, E. H., with Atchley, Husted, Pullman, Alving & Eichelberger, 214 (Mal.)
Yui Huan Wen, with Kuo Shao Chou & Chang Chiang, E., 647 (Hel.)

Z

Zaffino, C., with Martelli, 1071 (Hel.)
Zaharia, N. I., 45 (R.F.)
—— & Bernfeld, M., 539 (Typh.)
—— & Dimitriu, A., 928 (Typh.)
Zaki, A., 321 (Mal.)
—— & Ragab, M. M., 257 (Chl.)
Zalman, M., David, P. & Hortopanu, 538 (Typh.)
Zanaty, A. F., with Nagaty, 664 (Haem.)
Zanetti, V., 146 (Lep.), 386 (Hel.)
—— & Lambrecht, F. L., 601 (Mal.)
van Zanten, T. V., 783 (Ulc.)
Zarafonetis, C. J. D., with Snyder, Murray, Yeomans & Wheeler, 817 (Typh.)
Zarnea, G., with Combiesco, Combiesco, Dumitresco & Popesco, 627, (931) (Typh.)
——, with ——, Dumitresco, Botez & Sturdza, 931 (Typh.)
——, with ——, ——, Sturdza, Botez & Ciurea, 931 (Typh.)
Zaugg, H. E., Rapala, R. T. & Leffler, M. T., (115) (Mal.)
Zavalia, A. U., 1151 (Lep.)
Zeliff, C., 194 (B.R.)
Zermati, with Athias & Timsit, (622) (Leish.)
Zia, S. H. & Chang, N. C., 346 (Typh.)
——, with Chen-Jen, 140 (Rab.)
Zieve, L. & Conley, R. H., (849) (Hel.)
Zilisteano, C., with Combiesco, Dumitresco, Sturdza, Botez, Popesco & Panaitesco, 929 (Typh.)
Zimmerman, S. P. & Dugger, S., 664 (Haem.)
Zivković, V., with Simić, (675) (Ent.)
Zoltai, N., 896 (Mal.)
Zuckerman, A., with Adler, 449 (Leish.)
Zuckerman, J. L., Zymaris, M. C. & Natelson, S., 660 (Sp.)
Zuidema, P. J., 636 (Am.)
de Zulueta, J. & Bates, M., 517 (Mal.)
——, with ——, 698 (Mal.)
Zumpt, F., 875 (Ent.)
Zúniga, H. & Aguilar Rivas, A., 6 (Mal.)
Zymaris, M. C., with Zuckerman & Natelson, 660 (Sp.)

INDEX OF SUBJECTS

(With a few exceptions, the entries in heavy type refer to Sections in which abstracts on the subject indicated are grouped together. Page numbers within brackets indicate papers cited by title only.)

Abscess of spleen
with sicklaemia in an African, 1182
Acanthocheilonema perstans
infection
in Anglo-Egyptian Sudan, 957
Belgian Congo, 602
treatment
hetrazan, 957, 1066
Acariscus masoni
indistinguishable from larva of *Trombicula splendens*, 877
Actinomyces spp.
fluorescent staining, 871
Actinomycosis
in Ecuador, 573
Netherlands East Indies, 83
Aëdes
control
in Alaska, (1088)
Aëdes spp.
adersi, and jungle yellow fever in Kenya, 542
aegypti
in Arizona, 582
Caribbean Islands, 675
Kainanto, Japan, (499)
Liberia, 587
Netherlands Windward Islands, 408
Socotra, 11
action of antimalaria drugs on infected, 909
biology on Ivory Coast, 1186
breeding places on Ivory Coast, 1186
in plant axils, 172
control
periodical use of DDT necessary in British Guiana, 1120
experimental effect of humidity on oöcysts of *P. gallinaceum*, 710
temperature on oöcysts, 710
experiments in cross-breeding with *Aëdes albopictus*, 673
jungle yellow fever and, in Kenya, 542
nutrition of larva, (408) (*bis*)
oviposition, choice of surface for, 672
permeability of fabrics to, 522
precipitin test for feeding habits, 93
stimuli attractant to man, 408
africanus
jungle yellow fever and, in Kenya, 542
vector of jungle yellow fever in Uganda, 457, 823
yellow fever in Central Africa, 932
albopictus
experimental cross-breeding with *Aëdes aegypti*, 673
australiensis, in Queensland, (581)
busckii, in Netherlands Windward Islands, 408
campestris, in Manitoba, 580
cinereus, in Manitoba, 580
Aëdes—cont.
communis, in Manitoba, 580
deboeri, possible vector of jungle yellow fever in Kenya, 542
dorsalis, larvicides compared, 412
excrucians, in Manitoba, 580
flavescens, in Manitoba, 580
leucocelaenus, yellow fever virus and, 1027
nearcticus, in Manitoba, 580
nigripes, in Manitoba, 580
notoscriptus, reaction to aircraft environment, 171
pallidostriatus and filariasis in Ceylon, 487
papuensis, in Australasia, (974)
pipersalatus and filariasis in Ceylon, 487
pseudoafricanus, new species in Nigeria, 823
punctor, in Manitoba, 580
scutellaris scutellaris, biology of, in New Guinea, 1187
simpsoni
breeding in plant axils, 172
vector of jungle yellow fever in Uganda, 824
yellow fever in Central Africa, 933
squamiger, larvicides compared, 412
taeniorhynchus
permeability of fabrics to, 522
vector of *Dermatobia cyaniventris* myiasis in French Guiana, (582)
vittatus, in Socotra, 11
Aerosols
deposition, laws of, 877
dispersion of, 877
effectiveness of, 877
Aerva tormentosa, in treatment of tropical ulcer, 781
AEX concentration method for worm eggs, 53, 642.
African Medical Handbook [GOARNISSON] (book review), 990
Agglutination, intravascular, and old age, 12 (*see* also "sludged blood")
"Agrocide" for Anopheles control, 1121
Ainhum
in Tripolitania, 1087
aetiology, 1087
Aircraft carriage of insects, 171
insecticide spraying on, 172
suggestion for Commonwealth air-route sanitation, 289
Air Travel, Health Regulations for, 413, 1091
regulations
cholera inoculation, 1092
immunization of travellers, 1092
personal declaration of health, 1092
plague inoculation, 1091
transit passengers, 1092
typhus inoculation, 1091

Aleurisma albisicans see Trichophyton albisicans

Allodermanyssus sanguineus
natural vector of rickettsialpox, 248
new locality records of, 1025

Aluminium in treatment of tropical ulcer, 87

Amblyomma
americanum
in Florida, 349
biology of, in laboratory, 175
brasiliense, vector of typhus in Brazil, 930
cayennense, vector of typhus in Brazil, 930
striatum, experimental transmission of Mexican spotted fever by, 134

Amoebae
enumeration of, in cultures, 829
in animals at Rome Zoological Gardens, 179
parasitic, cultivation, 260

Amoebiaemia, 466

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS, 40-42, 144-146, 257-262, 361-367, 465-470, 546-549, 632-637, 740-745, 828-835, 936-943, 1031-1045, 1145-1148.
in Aden, 939
Bantu Africans, 831
Britain, 42
Canada, 635
Chicago, 1031
Ecuador children, 573
England, 936
India, 466, 741, 939
forces returning from, 362
Mediterranean, in forces returning from, 362
Netherlands, 828
North Africa, 546
South Persia, 632
aggravation by bacteria, 937
cases in Johns Hopkins Hospital, 1936-1946, 939
in cats, associated with bacterial infection, 636
cerebral abscess in, 645
chronic
cardiovascular complications in, (1143)
symptomatology, 1034
cutaneous, 365, 1034
treatment by emetine and glacial acetic acid, 1034
cyst-passers, from India and Burma more infective than those from the Mediterranean, 469
diagnosis
endoscopy, 1033
faecal examination, 1033
methods compared, 1033
serological, 1033
disease of temperate climates also, 1031
duodenal ulcer and, 361
dysentery second to bacillary, 546
epidemic
in Japan, 547
clinical manifestations, 548
epidemiology in North Africa, 546

Amoebiasis—*cont.*
experimental chemotherapy of, 1036
Ya Tan Tze in, 366
general review of the problem, (144)
generalized, due to a Protozoon resembling *Iodamoeba bütschlii*, 41
heart-block in, 1035
hepatitis, chronic, and, 635
household infection, 936
iliac abscess and, 365
intestinal
radiology not typical, 146
simulating chronic cholecystitis, 364
surgical aspects of, 365
treatment
chlorobexol, 259
E.B.I. and Chiniofon compared, 258
latent
diagnosis, 939
treatment, 939
left hypogastric sign, 144
literature, trend of, 1031
liver abscess, 741, 938
sporadic in Britain, 42
in Netherlands East Indies, 145
Paraguay, 362
Paris, 362
diagnosis, pneumoperitoneum, 144
treatment
chloroquine, 744
emetine, 363
stovarsol, 363
yatren, 363
pathogenesis, 546, 547
pulmonary, spread by blood-stream, 363
in rats, 941
experimental and spontaneous, 259
reinfection, 939
respiratory allergy and, 145
rôle of bacteria in, 257
secondary infection in, 146
septicaemic symptoms in, 364, 466
treatment, (742)
amibiarson, 467
anayodin, blood-iodine level after, 940
aureomycin, 1044
Brucea javanica, 366
carboxylic acid derivative, 1045
carobinase, 833
causes of failure, 939
chiniofon, blood-iodine level after ,940
combined drugs, 1145
iodine preparations and arsenicals, 940
conessine, 365, 469, 743, 1037
diodoquin, 468, 831
and sulphasuxidine, 742
blood-iodine level after, 940
discussion on, 1146
E.B.I., 831
emetine, 831
and conessine compared, 1037
distribution in tissues, 1035
Hargreaves method, 1145
hyaluronic acid, 549
iodoform, 832
Jacaranda recurrens extract, 833
Kurchi bark, 1037
Paramibe, 743
penicillin, 831

Amoebiasis—*cont.*
treatment—*cont.*
quinoxyl retention enema, 466
sulphasuxidine, 831
thioarsenites as amoebicides, 1146
vioform, blood-iodine level after, 940
ulceration co-existent with typhoid, 741
water-borne
epidemiological problems, 1031
incubation period, 1032
survival of cysts, 1032
Amoebic
abscess of brain, 1034
liver, 938
in India, 741
treatment by chloroquine, 1036
colitis
diagnosis, radiological, 258
hepatitis, 741
in India, 741
diagnosis
elevation of diaphragm, 1034
treatment
conessine, 832
emetine and streptomycin, (744)
vaginitis, 742
Amoeboma in India, 741
Anacardium occidentale as vermicide, 54 (*see also* Cashew Oil)

ANAEMIA
in Fiji, 392
Punjab, 771
São Paulo, Brazil, 863
Addison's in Punjab, 771
Cooley's
in Australia, 966
Cyprus, 567
negroes, 966
detection of mild types, 772
dietary deficiency and, 863
dyshaemopoietic, 772
erythroblastic *see* Cooley's anaemia
hookworm, in Philippines, 954
hypochromic, with hookworm, in Fiji, 392
macrocytic
in Burma sepoys, 491
Punjab, 771
Uganda, 664
hyperchromic
treatment by vitamin B_{12}, 1168
neurologic sequelae, 165
nutritional
effect of injection of animal protein factor concentrate, 1073
treatment
vitamin B_{12}, 1167
parenteral, 864
nutritional macrocytic [SIPPE] (book review), 506
pernicious, injection of animal protein factor concentrate, 1073
relation to ankylostomiasis, 664
treatment
anahaemin, 864
Examen, 864
folic acid, 80, 81, 966
Reticulogen, 864

Anaemia—*cont.*
macrocytic—*cont.*
treatment—*cont.*
thymine, 80
vitamin B_{12}, 80, 566, 1167
tropical, 166
megalocytic
treatment by folic acid, 393
pernicious
in the tropical negro, 664
treatment
folic acid, 165
vitamin B_{12}, 566, 864
pregnancy
treatment
folic acid, 81
pteroylglutamic acid, 80
sickle cell, (78), 1074
in Africa, 665
Brazilian Indians, 666
Curaçao, 966
South Carolina, 1075
alopecia and, 865
bone changes in, 967
conglutination and, 1075
diagnosis, rapid, 1168
diagnostic test, 865
electrocardiographic abnormalities, (280)
experimental production, 1074
fate of transfused corpuscles, 492
inheritance of, (1074)
life-span of, 492
ovalocytosis and, 1075
pathogenesis, 492
pathological significance, 1075
plasma transfusions in, 1076
rapid determination of sickling by dithionite, 774
rapid method of demonstrating, 492
sickling in new-born negroes, 775
sudden death in, 665
survival of red cells, 773
viscosity of erythrocytes, 280
Anaplasma marginale in rodents of Asmara, 1161
Anchau Settlement Scheme, 229, 1128
Ancylostoma
brasiliense
creeping eruption and, (66)
in French Guiana, 853, 1087
Martinique, 577
Szechuan dogs, 376
Alberta dogs, 677
caninum
human infection in China, 486
vermicidal activity of Cashew oil on, 54
duodenale infection
coincident with *Isospora belli*, 1148
as treatment of polycythaemia vera, 664
Animal colony, experimental, in West Africa, 587
Encyclopaedia. Mammals. [WENDER] (book review), 1194
Anisus convexiusculus intermediate host of echinostome in Java, 63
sarasinorum first intermediate host of echinostome in Java, 64

ANKYLOSTOMIASIS,
see also Ancylostoma spp.
in British Guiana, 589
Durban, 751
Gabon estuary, 844
Kenya, 641
Nairobi children, 432
Okinawa, 154
Philippines, 954
Portugal, 1062
Portuguese Guinea, 844, 1013
Queensland, 852
campaign in Queensland, 852
cause of anaemia in Brazil, 863
duodenal ulcer and, 361
epidemic, (383)
estimation of worms by egg-counts in faeces, 953
kwashiorkor syndrome and, 665
lesions due to, 66
in practice, 953
treatment
Chenopodium ambrosioides, 954
hexylresorcinol, 485
tetrachlorethylene, 485

Anopheles
of Bohemia and Moravia, 800
Brazil, 319
China, 603
Danzig coast, 1104
Finland, 205
Kenya highlands, 898
Martinique, 318
North Borneo, 1002
Sweden, 205
Tarapaca, N. Chile, 112
Thailand, 11
Veracruz, Mexico, 899
breeding-places in Southern France, 1104
control
DDT and benzene hexachloride by helicopter, 1120
in Italy, 437
mode of action, 440
residual, 908
distribution
in Burma, (517)
Ceylon, (517)
India, (517)
Pakistan, (517)
eradication from Cyprus, 807
hibernation and gonotropic cycle, 516
Kerteszia breeding in Bromeliads, 800
larvae
collected in Arabia, 516
Copepods as natural enemies, (1118)
growth of, in sea-water, 432
Mayalan, identification of, 11
nocturnal activities of, in Formosa, 900
Nyssorhynchus, report on, in Dutch Guiana, 698
pupae in nearctic north of Mexico, (900)
West Africa, 697
seasonal cycles of, in Colombia, 698
Venezuelan, natural oöcyst infection 12, (211)
water, chemistry and reduction of, 112

Anopheles
aconitus
in India, 110
Netherlands East Indies, 110
adenensis
larvae in Arabia, 517
aitkeni new variety in Borneo, (800)
var. *bengalensis* in Formosa, 900
albimanus
in Central America, 441
El Salvador, malaria and, 6
North-east Mexico, 429
Porto Rico, 218, 318
Venezuela, 210, 211
Veracruz, Mexico, 899
eradication of, from Porto Rico, 218
light trap collection of, 318
natural oöcyst infections of, in Venezuela, 12
susceptibility to foreign *P. vivax*, 323
albitarsis
in Argentina, 332
seasonal cycle in Colombia, 698
var. *domesticus* in Brazil, 319
annularis
in Burma, 210
India, 110
nocturnal activities in Formosa, 900
apicimacula in Veracruz, Mexico, 899
aquasalis
in Brazil, 319
British Guiana, 589
Dutch Guiana, 698
Martinique, 318
control
DDT residual house-spraying ineffectual, 1120
argyritarsis
in Martinique, 318
Veracruz, Mexico, 899
seasonal cycle in Colombia, 698
barbirostris
in Burma, 210
India, 110
Szechuan, 429
malaria and, in North Borneo, 1002
barbumbrosus
in N. Borneo, 1002
malaria and, in Thailand, 11
bellator
malaria vector in Rio de Janeiro, 514
bifurcatus see A. claviger
brasiliensis
in Brazil, 319
candidiensis
malaria and, in China, 603
chrystii, malaria and, in Uganda, 9, 10
cinereus
larvae in Arabia, 517
claviger
in Azouniyeh, 707
Bohemia and Moravia, 800
Danzig coast, 1104
Morocco, 317, 432
Salerno, 8
altitude and seasonal breeding, 432
eradication from Cyprus, 807

Anopheles—cont.
coustani
in Morocco, 317
larvae in Arabia, 517
malaria and, in Uganda, 9
crucians
winter survival in S. Carolina, 1002
culicifacies
in India, 110
infected by *T. kalwanensis*, 126
larvae in Arabia, 517
malaria and,
in Bombay, 17
Fort Sandeman, India, 11
Thailand, 11
var. *adenensis*
in Socotra, 11
darlingi
in Argentina, 332
Bolivia, 218
Brazil, 319
British Guiana, 589
Dutch Guiana, 698
biology of, 212
control
in Amazonia, 331
periodical use of DDT necessary in British Guiana, 1120
duration of action of DDT on, 442
natural oöcyst infections of, in Venezuela, 12
oviposition sites, 517
rearing of, 212
seasonal cycle in Colombia, 698
demeilloni
in Uganda, 9
dthali
larvae in Arabia, 517
var. *wardi* in Socotra, 11
dureni in Ruanda-Urundi, 876
eiseni in Veracruz, Mexico, 899
elutus see A. sacharovi
farauti
biology of, in New Guinea, 1105
filariasis and, in New Guinea, 1105
vector of malaria in New Guinea, 1105
filipini in Manila City, 518
flavicosta in West Africa, 697
fluviatilis
larvae in Arabia, 517
malaria and,
in Bombay, 17
Thailand, 11
winter variations in larvae of, in India, 11
funestus
in East Africa, 209
Kenya highlands, 898
Uganda, 10
bionomics of, 209
control
pyrethrum, 908
gambiae
in Belgian Congo, 330
Cape Verde Islands, 208
East Africa, 209
Kenya highlands, 898
Portuguese Guinea, 1105
Liberia, 587
Uganda, 10
Anopheles—cont.
gambiae—cont.
barrier to invasion of Egypt by, 523
bionomics of, 209
breeding on *Potamogeton* in Egypt, 516
control
dispersible powder DDT, 439
Gammexane, 440
pyrethrum, 908
eradication from Egypt, 438, 523
vector in Belgian Congo, 601
Nairobi, 1104
hispaniola larvae in Arabia, 517
in Morocco, 317
hyrcanus in Burma, 210
in Southern France, 1103
breeding-places in Central Asia, chemical factors of, 10
larvae in Arabia, 517
var. *nigerrimus*
in India, 110
Manila City, 518
Szechuan, 429
var. *pseudopictus* in Venice, 800
sinensis
in China, 219.
Szechuan, 428
malaria and, in China, 603
nocturnal activities in Formosa, 900
ininii, (289)
insulaeflorum, malaria and, in Thailand, 11
jeyporiensis
in Burma, 210
Indo-China, 206
malaria and, in China, 603
var. *candidiensis*, nocturnal activities in Formosa, 900
kingi in Uganda, 10
kochi
malaria and, in the Philippines, 518
North Borneo, 1002
letifer
residual effect of DDT spray on, 1118
leucosphyrus
in Burma, 210
malaria and, in North Borneo, 1002
varieties of, 1002
vector of malaria
in Assam, 1002
Borneo, 1002
Burma, 1002
litoralis in Manila City, 518
ludlowi in North Borneo, 1002
nocturnal activities in Formosa, 900
maculatus in Burma, 210
insecticides and, 613
malaria and,
in China, 603
N. Borneo, 1002
nocturnal activities in Formosa, 900
residual effects of DDT spray on, 1118
maculipennis
in Finland, 205
Morocco, 317, 432
Sweden, 205
altitude and seasonal breeding, 432
control
dubious effect of DDT, 908

Anopheles—cont.
maculipennis—cont.
hibernation in Venice and gonotropic cycle, 516
periodicity in larval development, 8
" races " of, distribution in Germany, 603
in Southern France, 1103
var. *atroparvus*
on Danzig coast, 1105
in Hungary, 896
Netherlands, 315
Salerno, 8
Southern France, 1103
Sweden, 205
malaria and, in China, 603
refractory to certain strains of *P. falciparum*, 437
technique for breeding, 8
vector in Rumanian epidemic, 1115
cambournaci, 1103
freeborni
experimental hybridization with *A. quadrimaculatus*, 318
susceptibility to foreign *P. vivax*, 323
labranchiae
in Corsica, 315
Isle of Elba, 315
Salerno, 8
maculipennis
absent from Hela Peninsula, 1105
on Danzig coast, 1104
melanoon, 1103
in Salerno, 8
messeae
in Bohemia and Moravia, 800
Danube Valley, 1115
Danzig coast, 1105
Germany, as potential vector, 426
Hungary, 896
Poland, chief vector, 1000
Salerno, malaria and, 8
Southern France, 1103
Sweden, 205
Upper Silesia, 426
sacharovi (*elutus*) *see A. sacharovi*
typicus
in Bohemia and Moravia, 800
Hungary, 896
Salerno, 8
Southern France, 1103
Sweden, 205
Upper Silesia, 426
manalangi
in Manila City, 518
mangyanus
malaria vector in the Philippines, 518
marshalli gibbinsi, malaria and, in Uganda, 9
marteri
in Azouniyeh, 707
Morocco, 317
melas
in Mauritius, 516
control of breeding, by coastal swamp drainage, 1117
Anopheles—cont.
minimus
in Assam, 217
Burma, 210
Indo-China, 206
Szechuan, 429
malaria and, in China, 603
Thailand, 11
nocturnal activities in Formosa, 900
var. *flavirostris*
in Manila City, 517
malaria vector in the Philippines, 518 612
moucheti in Belgian Congo, 330
multicolor
in Morocco, 317
larvae in Arabia, 517
vector of malaria in Egypt, 523
neomaculipalpus in Veracruz, Mexico, 899
nuñez-tovari in Dutch Guiana, 698
oswaldoi in Dutch Guiana, 698
pallidus in India, 110
paludis in Belgian Congo, 330
parapunctipennis in Veracruz, Mexico, 899
pattoni in Szechuan, 429
malaria and, in China, 603
pessoai
in Brazil, 319
French Guiana, (289)
philippinensis
in Burma, 210
India, 110
Lower Bengal, chief vector in, 110
malaria and, in N. Borneo, 1002
plumbeus in Salerno, 8
pretoriensis in Cape Verde Islands, 209
pseudopunctipennis
in Argentine, 332
Central America, 441
Chile, 112
El Salvador, 6
North-east Mexico, 429
Venezuela, 211
Veracruz, Mexico, 899
control
residual DDT spray in Mexico, 1119
food preferences of, in Peru, 12
residual effect of DDT on, 614
seasonal cycle in Colombia, 698
susceptibility to foreign *P. vivax*, 323
vector of malaria in Chile, 1008
Peru, 1027
water chemistry and, 112
var. *franciscanus*
flight range, 174
pulcherrimus larvae in Arabia, 517
punctimacula
in Veracruz, Mexico, 899
food preferences of, in Peru, 12
punctipennis
in North-east Mexico, 429
susceptibility to foreign *P. vivax*, 323
punctulatus
biology of, in New Guinea, 1105
filariasis and, in New Guinea, 1105
vector of malaria in New Guinea, 1105
var. *punctulatus*
breeding in laboratory, 1001
life-cycle of *P. malariae* in, 431

Anopheles—cont.
quadrimaculatus
in Florida, 111
North-east Mexico, 429
Veracruz, Mexico, 899
action of antimalaria drugs on infected, 909
experimental hybridization with *A. maculipennis freeborni*, 318
hibernation of, 1002
permeability of fabrics to, 522
rearing on large scale, 111
susceptibility to foreign *P. vivax*, 323
testing insecticides, 524
ramsayi in India, 110
rangeli, seasonal cycle of, in Colombia, 698
rufipes var. *ingrami* in West Africa, 697
sacharovi
in Corsica, 315
eradication from Cyprus, 807
malaria and, in China, 603
in Salerno, 8
malaria, chief vector of, in Saideh, 707
vector in Rumanian epidemic, 1115
sergenti
in Morocco, 317
larvae in Arabia, 517
vector of malaria in Morocco, 317
splendidus, nocturnal activities in Formosa, 900
stephensi
infectibility with Lagos strains of *P. falciparum*, 437
larva in Arabia, 516
malaria and, in Fort Sandeman, India, 11
strodei
in Veracruz, Mexico, 899
seasonal cycle in Colombia, 698
subpictus
in India, 110
filariasis and, in Ceylon, 487
var. *indefinitus* in Manila City, 518
sundaicus
control of breeding, by *Eichhornia speciosa*, 17
in Malaya, by DDT, 709
residual effect of DDT spray on, 1118
varying infectivity, 605
superpictus
in Azouniyeh, 707
Cyprus, eradication, 807
larvae in Arabia, 517
malaria and, in Salerno, 8
tarsimaculatus
chief vector of malaria in Rio de Janeiro, 514
tessellatus
in Manila City, 518
North Borneo, 1002
nocturnal activities in Formosa, 900
triannulatus
seasonal cycle in Colombia, 698
var. *davisi* in Dutch Guiana, 698
turkhudi
in Morocco, 317
larvae in Arabia, 517
vagus
in Burma, 210
India, 110
development of larvae in sea-water, 432
varuna in India, 110
vestitipennis in Veracruz, Mexico, 899
Anophelines, South American, Atlas of, [LEVI CASTILLO] (book review), 1193
Anthelmintics, observations on, 480
Antimalarial(s), (907)
aliphatic ketones, (114)
aryl-cyanoguanidines, (115)
inhibition by pteroylglutamic acid, 1125
purines, 1125
naphthoquinone, (115)
substituted arylbiguanides, (115)
sulphabiguanide derivatives, (114)
synthetic, (215-16)
paludrine homologues, 118
tolerability of, 904
Antimalarial premunition, 206, 207, 513
Antimonials
effects on heart in schistosomiasis, 61
Antivenenes
Ipsen's method of testing potency of, 394
potency, testing of, 394
preparation of, 393
scorpion
Prionurus australis, 280, 868
snake
Bitis spp., 967
cobra
standardization of, 493
titration of, 568
Daboia
standardization of, 493
titration of, 568
Naja flava
standardization, (775)
Aoki method of staining *M. leprae*, 843
Aphthosis of Touraine *see* Behcet's syndrome
Appendicitis
Entamoeba histolytica, and, 938
enterobiasis and, 857
parasites and, 578, 956
Aralen *see* Chloroquine
Argas persicus
SNP as insecticide, 1131
toxicity of SNP for, 1188
Armigeres obturbans, filariasis and, in Ceylon, 487
Aromatic diamidines, pharmacology of, 916
Arthropods
of interest in Colombia, (92)
medical and veterinary, (92) 981
Arthus reaction produced by protozoon, 450
Artibeus planirostris trinitatis and paralytic rabies in Trinidad, 254
Arylbiguanides substitutes in malaria, (115)
Arylcyanoguanidines in malaria, (115)

ASCARIASIS
in Durban, 751
Kenya, 641
Nairobi children, 432
Portugal, 1062
South Africa, 751
appendicitis and, 956
asthma and, 1183
cholangitis, suppurative in, 761
dangers of, 761
diagnosis by radiology, 273
hepatic abscess in, 761, 956
intestinal obstruction in, 385, 761
perforation in, 956
ulceration in, 956
intussusception in, 956
Loeffler's syndrome and, 486, 871, 1062
mechanical obstruction in, 956
otitis media in, 761
pancreatitis, haemorrhagic in, 956
suppurative in, 956
perforation of intestine in, 761, 956
peritonitis in, 761
pulmonary abscess in, 761, 956
surgical, (561)
complications of, 955
treatment
ascaridol, synthetic, 384
Hetrazan, 385
hexylresorcinol, 485
tetrachlorethylene, 485
volvulus in, 956

Ascaridia columbae, effects of age, diet, and light on, (1064)

Ascaridol, synthetic, in ascariasis, 384 (*bis*)

Ascaris
lumbricoides
in autopsies in Okinawa, 155
experimental infection, eosinophilia and, 561
of guineapigs, 561
extracts causing cutaneous manifestations in guineapigs, 653
haemoglobins of, (854)
haemolytic extract due to associated *Proteus* organisms, 654
haemotoxin of, 653
immunity to, in mice, (854)
in liver, 1063
pancreas, 1063
spleen, 1063
infection
in Gabon estuary, 644
Philippines, 152
Portuguese Guinea, 844
returned soldiers, 61
Scioa, 1033
Venezuela, 273
intestinal obstruction due to, 385
Loeffler's syndrome and, 871
pharmacology of, in the pig, (854)
physiology of, in the pig, (854)
transmission by paper money, 761
treatment
Chenopodium ambrosioides, 954
megalocephala, toxic extract from, 851

Ascaris—cont.
suis
action of alkylhydroxybenzenes on, 762
hexylresorcinol on, 762
antigenicity of extracts, 1063
penetration of anthelmintics, (486)
toxicity of extracts, 1063

Atricholaelaps megaventralis ectoparasite of rats in Mexico, 819

Aujeszky's disease
in chick embryo, pathology of, 1143
no cross-immunity with rabies, 825
virus cultivation in yolk-sac, 1143

Aureomycin
in endemic typhus fever, 453
Rocky Mountain spotted fever, 350
protective in experimental tick-borne typhus, 725
review of its uses, 725

Australorbis
centimetralis vector of schistosomiasis in Espirito Santo, 643
glabratus
action of immune sera on cercariae from, 55
elimination
from Maracay, 756
Venezuela, Federal District, 755
experimental infection with *Sch. mansoni*, 150, 754
multiplication of, in Venezuela, 755
vector of *Sch. mansoni*
in Cuba, 1058
Paraná, 1058
var. *lugubris* in Dutch Antilles, 754

Austrosimulium
bancrofti
in Queensland, 406
difference from *A. pestilens*, 406
pestilens in Queensland, 406

Avitaminosis in Jullundur, 767

Ayerza's disease
in Brazil, 847
Egypt, 847
and pulmonary schistosomiasis compared, 58

Bacteriology, Haematology and Parasitology [STITT] (book review), 185

Bacterium aerogenes in intestinal amoebiasis, 257

Balanites as molluscicide, 266

Balantidiasis *see* Dysentery, balantidial
in Kenya, 641

Balantidium coli
in Argentine, (42)
Mandrillus leucophaeus, 262
monkeys in London, 261
Philippines, 152
growth requirements of, 634
human infection
in Egypt, 942
Kenya, 641
treatment by thioarsenites, 1047

Bandicota bengalensis in Rangoon, 256

Bartonella muris in rodents of Asmara, 1161

BARTONELLOSIS, 135-136, 354-355, 628, 1027
in Ecuador, 573
Bartonella bacilliformis anaemia, clinical features of, 135
Carrión's disease
nervous symptoms in, 628
treatment
intradermal autohaemotherapy, 354
penicillin, 628
" Bathing drawers " dermatitis, 652
Bechuanaland Protectorate, report on water resources, 676
Beetles, human infestation by, 785
Behcet's syndrome
in Chinese woman, 498
Cuba, 91
differential diagnosis, 498
Belgian Congo, Annual Report of Medical Directorate-General for 1948, 1189
Belivron in the treatment of leprosy, 50
Benzil for impregnating clothes against typhus mites, 540
Benzoic acid for impregnating clothes against typhus mites, 540
Berek effect in staining blood-parasites, 502
Beriberi
in Philippines, 390
thiamin excretion in, 391
Biomphalaria see Planorbis
pfeifferi, molluscan host of *Sch. mansoni* in Kenya, 641
Bisulphate-binding substances (B.B.S.) in malnutrition, 278
Bitis
arietans antivenene, 967
gabonica antivenene, 967
nasicornis antivenene, 967
Bixa orellana see also Urucú
preparations as protectives against sunburn, 671
Bixine, protective against sunburn, 671
Black fungus *see* Tinea nigra, *Cladosporium wernecki*
" Black snake " *see Pseudoboa cloelia*
BLACKWATER FEVER, 18, 120-122, 336, 448, 528-530, 616-617, 810-811, 913, 1012
in China, 603
French Equatorial Africa, 120
anuria
mechanism of, 120
pathology of, 448
prolonged in, 528
treatment by decapsulation of kidneys, 528
artificial kidney, (18)
disturbance of renal function in, 617
hepato-renal syndrome in, 529
Blackwater Fever—*cont.*
low ascorbic acid in, 913
methaemalbumin in, 616
P. vivax and, 18
Rh factor in, 121
Schumm's reaction in, 616
treatment
ascorbic acid, 913
complete substitution of blood by donor, 1012
neo-antergan, 336
penicillin, 18
surgical, 336
Blaps mortisaga in man, 1089
Blastocystis
in animals at Rome Zoological Gardens, 179
infection in Kenya, 70
Blastocystis hominis, detection by duodenal intubation, (380)
Blastomyces dermatitidis
cross-reactions with *Histoplasma capsulatum,* 869
yeast-form cultures for complement fixation, 83
Blastomycin and histoplasmin compared, 779
Blastomycosis *see also Paracoccidioides brasiliensis*
in South America, 84, 168, 397
ano-rectal, 84
buccal, (167)
Hodgkin's disease and, 397
treatment
failure of promin, 1176
streptomycin, 1176
sulphadiazine, 84
vaccine, 84
and sulphonamide, 168
Blood blister disease in Singapore, 73
cell counts, simplified method, (771)
erythrocytes
osmotic resistance in congenital haemolytic icterus, 773
Cooley's anaemia, 773
sickle cell anaemia, 773
varying with race, 773
films, staining of, by alizarin red S and phosphomolybdic acid, 95
cyanol, 95
fuchsin and methyl green, 95
panchromic, rapid, 96
haemoglobin estimation, 661, (771)
by grey-wedge photometer, 663
iron content of blood, 662
oxygen capacity, 662
values of Finland population, 1074
polycythaemia vera, treatment by *Ancylostoma* infection, 664
pressure
in American negro, 89
Australian aboriginals, 89
Bantus, 89
Bengalis, 88
Cantonese, 88
East Africans, 89
Egyptians, 88
Filipinos, 88
non-Europeans, 88

Blood—*cont.*
pressure—*cont.*
effect of climate on, 284
red cell dynamic in normal subjects, (773)
pernicious anaemia, (773)
polycythaemia vera, (773)
sickle cell anaemia, (773)
nomenclature of, 664
"sludged", 12 (*see also* Intravascular agglutination)
ultrasonic waves, effect on red corpuscles, 240

Blowflies, response to tarsal stimulation, 404

Bogalita, action of, in leprosy, 944

Bombyx mori, infection by Rickettsia, 451

BOOK REVIEWS, 180-194, 294-300, 506-508, 590-596, 678-686, 788-790, 881-886, 988-992, 1099-1102, 1191-1196.

Boquet and Nègre methylic antigen in diagnosis of kala azar, 127

Borrelia sogdianum see Spirochaeta recurrentis

Brachistosternus ehrenbergi, scorpionism by, 394

Bradykinin, release from plasma by *Bothrops* venom, 866

Brill's disease, *see also* Tabardillo
treatment by aureomycin, 539

British Guiana Settlement Commission report, 502

British Honduras Settlement Commission report, 502

Bromelia pinguin and mosquito breeding in Haiti, (112)

Bromeliad-breeding anophelines *see Kerteszia*

Brucea javanica in experimental amoebiasis, 366

Brucellosis in Ecuador, 573

Buerger's disease *see* Thromboangiitis obliterans

Bufo melanostictus, sparganosis in, 64

Bug, bed, vector of typhus in Brazil, 930

Bulinus
control by palm-leaf traps in Egypt, 646
effect of copper sulphate on ova of, 151
tropicus
inability to infect with *Sch. haematobium,* 150
Sch. mansoni, 150
molluscan host of *Sch. mansoni* in Kenya, 641
truncatus
ecological requirements, 946
egg output of, 151
methods of packing for transport, 946
seasonal variation of, in Iraq, 555
vector of schistosomiasis in Iraq, 554

Bullis fever, (1026)

Bureau of Vector Control, California, 500

Buthus
judaicus, stings by, in Palestine, 867
occitanus in North Africa, 280
stings by, treatment by antivenene, 280
P. australis antivenene, 868
quinquestriatus, stings by, in Palestine, 867

Callithrix
jacchus, variation of antibodies to yellow fever in serum of, 137
penicillata, variation of antibodies to yellow fever in serum of, 137

Callosciurus sp., exoerythrocytic forms of *P. vassali* in, 808

Caloncoba seeds, oil of, in leprosy, 944

Calotermes flavicollis, laboratory culture of, 975

Calotropis gigantea juice causing kerato-conjunctivitis, 1177

Camoquin in malaria, 435, 610, 611, 702

Canavalia ensiformis, dermatitis from ingestion of, 73

Cancer, exposure to sunlight and, 569
of skin, in Kenya, 569

Cancrum oris *see* Noma

Carate *see* Pinta

Carbarsone oxide in amoebiasis, 1147

Carboxymethylmercapto in amoebiasis, 1147

Carboxyphenylmercapto in amoebiasis, 1147

Cardiological problems in the tropics, 1084

Cardiovascular disease
among Central Africans, 575
in Costa Rica, 1084

Carpoglyphus and tropical eosinophilia, 577

Carrión's disease *see* Bartonellosis

Cashew oil as vermicide, 54 (*bis*)

C.C.906 *see* Carbarsone oxide

C.C.1037 *see* 2-carboxyphenylmercapto

Cephalin flocculation in tropical disease, 170

Cephalosporium acremonium, human infection, 571

Cercarienhüllen Reaktion *see* CHR test

Cercocebus, balantidiasis in, 262

Cercomonas infection in Kenya, 70

Cercopithecus, balantidiasis in, 262
aethiops, infection with Sudanese kala azar, 815

Chagasia bathanus in Veracruz, Mexico, 899
rozeboomi, new species in Brazil, 289

Ch'ang Shan *see Dichroa febrifuga*

Chemotherapy [SCHÖNHÖFER] (book review), 988

Chenopodium ambrosioides, oil of, as anthelmintic, 954.

Chiggers see also *Eutrombicula* spp.
animals hosts, 176

Chilomastix mesnili, as cause of diarrhoea in man, 834
in dysentery epidemic, 547
Scioa, 1033
infection
treatment
argyrol enema, 834
calomel, 834
Chitin and sorption of DDT, 291
Chloramphenicol *see* Chloromycetin
Chlordane
in control of Triatomidae, 449
insect control, 501
Chlorguanide *see* Paludrine
Chlorinated camphene, in insect control, 501
Chloromycetin
in rickettsial infection, 246
synthetic, and fermentation compared as to action on Rickettsiae, 626
in treatment of epidemic typhus, 131
Chloroquine, manufacture of, 804
pathological changes in rats fed with, (214)
tolerance of, 904
toxicity symptoms, 610
CHOLERA, 36-40, 143, 257, 358-361, 462-465, 631-632, 738-740, 826-828, 935-936, 1029-1031.
in China, 359
Egypt, 359, 462, 1029
biochemical studies, 1030
circulatory dynamics in, 257
clinical observations in China, 359
study, 1030
control
antifly campaign, 465
Egyptian epidemic, 1947, 463
long term measures, 40
preventive inoculation, 464
quarantine, 465
in rural areas of Bengal, 40
"Segregation Cottage", 40
short term measures, 40
epidemiography in France, (143)
epidemiology
pilgrimages and dissemination, 40
experimental infection of cats, 36
frogs, 37
mouse-protective tests by inhibition by chemicals, 143
Summary of Recent Abstracts, 1-5
treatment
chloromycetin, 826
Ringer's solution, 1030
sodium lactate, 1030
sulphaguanidine, 1031
vaccines
immunization, 360
Inaba strain
active immunization of guineapigs by, 39
bacterial titre following, 38
passive protection by, 39
Ogawa strain
active immunization of guineapigs by, 39
bactericidal titre following, 38
passive protection by, 39
Cholera—*cont.*
vibrios
antigenic analysis of, 631
Celebes and El Tor compared, 738
duration of carrier state, 464
Hikojima strain, 38
Inaba strain, 38
relationship with *Salmonellae*, 359
isolated at El Tor quarantine camp, 358
Ogawa strain and F.F., 37
V. cholerae
agglutination levels after inoculation, 935
bactericidal action of copper, 827
chemical inhibition of, in animals, 143
cultivation of, 740
experimental infection of animals, 36
"Filtrate Factor" (F.F.), 37
neutralization of, by sera, 37
immuno-chemical studies of, 827
normal saliva antibacterial, 143
thermostable antigen of, 631
viability, 464
CHR test in diagnosis of schistosome infection, 1154
Chromoblastomycosis
in Ecuador, 573
an Indian in S. Africa, 1176
Chrysomyia bezziana causing myiasis, 286
Chrysops spp.
importance as vectors of disease, 875
mechanism of feeding, 515
dimidiata
loiasis and, in British Cameroons, 563
distinctipennis
vector of *Loa loa* in Anglo-Egyptian Sudan, 957
longicornis
vector of *Loa loa* in Anglo-Egyptian Sudan, 957
silacea
loiasis and, in British Cameroons, 563
Cimex
mechanism of feeding, 515
Cimicifuga racemosa antidote to cinchonism, 520
Cladosporium wernecki, 83
Climate
disease and, in Ecuador, 572
effect on blood-pressure, 284
tropical
deterioration of materials in protection against, 504
nutrition and adaptation to, 963
Clinical Laboratory Methods and Diagnosis [GRADWOHL] 3 vols. Vol. III deals with Trópical Medicine. (Book review), 294-98
Clonorchis sinensis infection
in China, 152
dogs in Szechuan, 376
epidemic in Shanghai, 648
preparing way for other intestinal infections, 648
symptoms in epidemic, 648
treatment, surgical, 152

Clostridium tetani toxoid as inhibiting malaria relapses, 1112

Clothing
flea repellents and, (95)
toxicants and, (95)
impregnation against mite-borne typhus, 540
tick repellents and, (95)
toxicants and, (95)

Coccidioidal granuloma
in Argentine, 1173

Coccidioides immitis
Argentine and North American strains compared, 1174
fluorescent staining, 571
morphology and fructification of, 1173
strains vary in pathogenicity, 1174
systemic position of, 1173
varying virulence of strains of, 1174

Coccidioidin
cross-reaction with Haplosporangin, 1172
Histoplasmin, 1172

Coccidioidomycosis
in Argentina, 167, 1175 (*bis*)
Townsend mole, 496
coccidioidin tests in diagnosis, 167
complicated with tuberculosis, 870
contact, question of contagion by, 968
diagnosis, 780
coccidioidin, 1175
pathogeny of pulmonary cavitation, 495
persistence of pulmonary lesions, 780
pulmonary, 284
symptoms, 1080

Coccidiosis *see Isospora hominis* infection
in Ecuador, 573
rabbits, sulphonamides in, (470)

Cochliomyia
hominivorax
causing myiasis in Panama, 91
in Guadeloupe cattle, 171
macellaria
and transmission of *E. histolytica*, 937

Cockroaches, control, comparative toxicity of chlorinated compounds, 500

Coenurosis
human infection, 561
in France, 950
species, identity or difference of, 65

Coenurus
cerebralis
in Britain, 65
intraspinal, 65
glomeratus
whether immature *C. cerebralis*, 65
serialis
whether strain of *C. cerebralis*, 65

Colchicine
failure in *P. vivax* relapses, 1112

Coleoptera
accidental parasites of man, 1089

Colitis
post-dysenteric, 258
ulcerative, in Argentine, (42)

Collodion agglutination test for histoplasmosis, 870

Colocasia esculentum, mosquito breeding and, 172

Complement fixation, quantitative, for identifying Q fever strains, 931

Conessine
in amoebiasis, 1037
constitution of, (832)
and emetine compared, 1037

Conference, Fifth Commonwealth Entomological, report, 978

Conglutination complement absorption test in Q fever, 456

Congo, Red fever of the, 459

Congress on Tropical Medicine and Malaria, Fourth International, 1093

Contradens contradens
second intermediate host of echinostome in Java, 63

Contraverm *see* phenothiazine

Control of disease in a tropical mining community, 589

Copepods as natural enemies of Anopheles larvae, (1118)

Coquillettidia crassipes, vector of *F. malayi*, 67

Corbicula
lindoensis
second intermediate host of echinostome in Java, 64
rivalis
second intermediate host of echinostome in Java, 64

Cotton-rat as experimental animal for filariasis investigation, 1162
study of *Litomosoides carinii*, 387

Cotton-tail rabbit *see Sylvilagus floridanus*

"Crackled skin" in East Africans, 158

Creeping disease in Turkey, 91

Creeping eruption
in French Guiana, 853, 1087
ankylostomiasis and, 577
associated with Loeffler's syndrome, 1087
Strongyloides stercoralis infection, 652
treatment
ethyl chloride spray, 577
ice, 578

Cricetulus migratorius isabellinus, natural infection by *S. microti*, 1048

Ctenocephalides
canis
on rats in Mexico City, 499
in Saigon, 357
felis
on rats in Mexico, 819
Mexico City, 499
in Saigon, 357

Culex
in Africa, North, key to identification, (876)
americanus in Netherlands Windward Islands, 408

Culex—cont.
bahamensis in Netherlands Windward Islands, 408
cinereus in Ruanda-Urundi, 876
fatigans
in Caribbean Islands, 675
Liberia, 587
Netherlands Windward Islands, 408
Socotra, 11
United States of America, 673
" effective flight range ", 173
filariasis and, in Ceylon, 487
vector of filaria in Porto Rico, 762
habilitator
in Netherlands Windward Islands, 408
mauritanicus
validity of species, (876)
musarum breeding in plant axils, 172
pipiens
in United States of America, 673
var. *pallens*
reaction to aircraft environment, 171
quinquefasciatus see C. fatigans
sitiens
in Socotra, 11
filariasis and, in Ceylon, 487
stigmatosoma
flight range of, 173
tarsalis
flight range of, 173
precipitin test for feeding habits, 93
tritaenorhynchus
filariasis and, in Ceylon, 487
Culicines
acid-fast bacilli in, 368
tree-hole breeding parasites of larvae, (675)
Culicoides
suspected transmitter of *Dipetalonema streptocerca* in the Congo, 276
grahami
vector of *Acanthocheilonema perstans* in Anglo-Egyptian Sudan, 957
Culiseta
alaskaensis in Manitoba, 580
incidens, flight range of, 174
Cynomys gunnisoni
plague of, in fleas, 1144
Cysticercosis, (484)
in Chile, 381
Mexico, 381
cerebral, 381, 484 (850)
intraocular, (65)
of lungs, X-ray appearances, 1055
ocular, 1179
diagnosis
complement fixation, 382
resembling myopathy, (154)
Cysticercus
cellulosae in rodents of Asmara, 1161
fasciolaris in rodents of Asmara, 1161
Damodar-Hooghly Flood-Flush Scheme, 110
Davey chick test, standard inocula for, 118
DDT, duration of effect of sprays on building materials in Venezuela, 584
Death, causes of, classification, 1092
DEFICIENCY DISEASES, 71-77, 158-165, 277-279, 388-391, 489, 565-566, 657-658, 766-770, 860-861, 962-964, 1072-1073, 1166-1167.
in Anglo-Egyptian Sudan, 74
East African railway workers, 158
Gold Coast, 278
Malaya, 277
P.O.W. in Far East, 71
Singapore, 73
affections of mucous membranes, 73
" black tongue " and, 164
cutaneous affections, 73
low ascorbic acid as cause of onyalai, 860
low blood-vitamin C levels in W. African soldiers, 964
millet beer as protective food, 74, 75
ocular symptoms, 278
peanuts as protective food, 74, 75
phrynoderma in Fiji children, 768
serum protein in adult Chinese, 489
symptoms in P.O.W., 72
thiamin deficiency,
cardiac lesions in, 963
experimental, effect on heart of monkey, 1167
nervous system of monkey, 1167
vitamin C content of organs of West Africans, 964
xerophthalmia in Fiji children, 768
Deinocerites cancer
in Caribbean Islands, 675
Netherlands Windward Islands, 408
DENGUE AND ALLIED FEVERS, 30, 137-139, 458-459, 629-630, 727-728
in Madagascar, 30
control, 30
diagnosis, complement fixation, 629
similarity to Red fever of the Congo, 459
virus
antigenic relationship with that of yellow fever, 630
cultivation, 137
in embryo chicks, 458
immune serum, 138
immunity studies, 727
mouse-brain, 138
rabbit-eye, 138
virus fixe, 137
Dermacentor
marginatus in U.S.S.R., 249
nuttalli in U.S.S.R., 248
pictus in U.S.S.R., 249
silvarum in U.S.S.R., 248
vector of spotted fever in U.S.S.R., 249
variabilis in Florida, 349
Dermanyssus gallinae on rats in Mexico, 819
Dermatitis
allergic, in Calcutta, 570
caused by contact with *Hylesia*, 282
mepacrine, (905)
Neoschoengastia nuñeri larvae, 394
quinacrine, 607
seborrhoeic, in Calcutta, 570
verrucous, in Cochin China, 968
Dermatobia cyaniventris causing myiasis in French Guiana, (582)

DERMATOLOGY AND FUNGUS DISEASES, 83-84, 166-168, 281-284, 394-397, 494-497, 569-572, 777-780, 868-871, 968-969, 1077-1081, 1170-1176
skin disorders in soldiers in the tropics, 1077
sporotrichosis, 1079
verrucous condimons of legs and feet in Africa, 1078
Dermatophytosis
in Georgia, 282
treatment, 496
Dermatosis
"crazy pavement"
in East Africans, 158
Indian children, 163
of feet, treatment, 282
Leishmania, Demodex and Sarcoptes compared, (1021)
symmetric lividities of the feet, 282
Dermlengue, 254
Desert sore *see also* Veldt sore
in Egypt, 783
C. diphtheriae in, 783
organisms associated with, 783
Desmodus rotundus murinus
transmitter of rabies in Mexico, 254
Trinidad, 254
Desogene, wetting agent for staining blood-parasites, 502
Detarium senegalense, vitamin C content of, 1096
Diamanus montanus and plague in California, 630
Diarrhoea
in children, diagnosis by rectal swab, 740
summer, associated with *Shigella* organisms in Shanghai, 789
Dichroa febrifuga
antimalaria alkaloid of, 614
in malaria, 611
Didelphys
azarae, reservoir host of *Tsruzi* in Ecuador, 1017
paraguayensis, reservoir host of *Tsruzi* in Ecuador, 1017
Dientamoeba fragilis infection in a Frenchman from Guinea, 367
treatment by thioarsenites, 1047
Dietary change due to locust plague, 767
deficiency in Fiji children, 768
not synonymous with nutritional deficiency, 766
problems in French Colonies, (1166)
Diethylcarbamazine chloride *see* Hetrazan
Dipetalonema streptocerca in Belgian Congo, 276
Diphyllobothrium
infection among Esquimos, 376
latum infection
in Alberta, 677
diagnosis by X-rays, 1160
larvae in rodents of Asmara, 1161
Diphyllobothrium—cont.
mansoni
in dogs in Szechuan, 376
experimental infection of cat, 561
dog, 561
guineapig, 560
rabbit, 560
Rana tigrina, 560
rat, 560
Diopterin in sprue, 661
Dioscorea dumetorum, poisoning by, in Anglo-Egyptian Sudan, 388
Diplocercomonas in rodents of Asmara, 1161
Dipylidium infection in Ecuador, 573
caninum, 54
in Szechuan dogs, 376
Uruguay, 66
human infection by, 66, (650)
Dirofilaria
immitis
in Guayaquil city, (386)
Szechuan dogs, 376
importance in filarial investigation, 1162
rabies and, in dogs, 139
treatment
anthiomaline, 276
arsenamide, 68
neostibosan, 276
repens
action of methyl violet on, 959
Diseases common in Guinea and Fernando Pó, 880
endemic, control in Iraq, 417
international statistical classification, 1092
Tropical, Manual of [MATHIS] (book review), 507
of Warm Climates, Their Clinical Features, Diagnosis and Treatment [DUBOIS & VAN DEN BERGHE] (book review), 1196
Distome, new, found in Ethiopia, 63
Dracontiasis in India, 157
Dracunculus medinensis infection
in India, 157
Portuguese Guinea, 1013, 1068
in hernial sac, 277
symptoms, 1068
DROPSY, EPIDEMIC, 866
in Bhagalpur, 866
acute cardiac failure in, 866
Duodenal ulcer
amoebiasis and, 361
ankylostomiasis and, 361
Durand and Giroud typhus vaccine in prophylaxis, 540
Dyschromic treponematosis *see* Pinta.
DYSENTERY
in Argentine, (42)
India, 741
South Persia, 632
associated with malaria, 606

Dysentry—*cont.*
bacillary
in Ecuador, 573
South Persia, 632
with amoebiasis, 467
carriers in S. Persia, 633
balantidial
in Egypt, 942
Norway, 1045
South Persia, 632
Zoological Gardens, London, 261
giardial
in France, 941
India, 942
avitaminosis A in, 1148
epilepsy in, (1147)
treatment
atebrin, 834
mepacrine, 942
new carboxylic acid derivative, 1045
sulphaguanidine, 633

East African High Commission Report for 1948, 1188

Echidnophaga gallinacea
on rats in Mexico, 819
City, 499
reduction by dusting with DDT, 247

Echinococcosis of lungs, X-ray appearances, 1055

Echinococcus see Hydatid disease.

Echinococus alveolaris of lung, X-ray appearances, 1055

Echinolaelaps echidninus
on rats in Mexico, 819
City, 499
reduction by dusting with DDT, 247

Echinoparyphium recurvatum
in man in Java, 63
Malayan Archipelago, 63

Echinostoma lindoensis
in Celebes, 64
Malayan Archipelago, 64
man in Java, 64
revolutum
in Java, 64
Malayan Archipelago, 64

Ectoparasites, apparatus for chemotherapeutic control, 292

Egyptian splenomegaly, with hepato-lienal fibrosis, 1058

Eichornia crassipes
larvae of *Coquillettidia* and, 67
Mansonia and, 67

Eimeria falciformis
in rodents of Asmara, 1161
nieschulzi
in rodents of Asmara, 1161

"Electric feet" in deficiency disease, 72

Elephantiasis
filariasis and, 401
nostras in France, 401

Elephantiasis—*cont.*
pathology of, 68
of scrotum
heparin and absence of thrombosis, 487
serum calcium and, 68
streptococcal
treatment by rubiazol, 854

Emetine
distribution studies, 467
excretion studies, 467
structure of, (940)
toxic action on heart, 636
toxicity studies, 467

Encephalitis
control in California, 500

Encephalitozoon see Toxoplasma

Endocarditis
gonococcal in Africans, 575
septicaemic in Africans, 575

Endochin in malaria, 219

Endolimax nana
in epidemic dysentery, 547
effect of diodoquin on, 469
in returning forces, 362

Entamoeba
caudata
new species from the dog in Brazil, 833
coli
in Esquimos, 376
Portuguese Guinea, 845
returning forces, 362
Scioa, 1033
cysts detected by duodenal intubation, (380)
in dysentery epidemic, 547
effect of diodoquin on, 469

Entamoeba
histolytica
action of carobinase on, 833
emetine on, 831
amoebostatic action of emetine, 831
appendicitis caused by, 938
cultivation, 40, 260, 828
advantage of streptomycin, 466
in hydatid fluid, (363)
culture methods, 634
cultures
effect of hyaluronic acid and hyaluronidase on, 549
synergistic activity of penicillin and streptomycin, 549
cysts
lethal effect of acetic acid on, 830
method of obtaining free from bacteria, 635
viability in soil, 829
effect of diodoquin on, 469
growth requirements of, 634
pathogenicity enhanced by bacteria, 937
phagocytosis of starches by, 637
strains of, varying resistance to drugs, 1043

Entamoeba histolytica infection
in Alberta, 677
Japan epidemic, 547
Kenya, 641
Nairobi children, 432
Philippines, 152
Portuguese Guinea, 845
rats, possible presence in, 941
returning forces, 61, 362
Scioa, 1033
associated with *Isospora hominis*, 942
vaginal discharge, 742
following clonorchiasis, 648
treatment
carbarsone oxide, 1147
carboxymethylmercapto, 1147
2-carboxyphenylmercapto, 1147
chloroquine after resistance to emetine, 744
conessine, 365
thioarsenites, 1147
Win 1011, 1147
respiratory allergy associated with, 145
invadens, cultivation, 260
muris
complicating experimental work with *E. histolytica*, 470
natural infection of rats, 470, 941
rodents of Asmara and, 1161
Enterobiasis
critical review, (70)
diagnosis, cellulose tape method, 1071
measures for dealing with, 766
re-infection and retrofection distinguished, 858
" retrofection " in, 858
treatment see under *Enterobius vermicularis* infection
Enterobius vermicularis
appendicitis and, 578, 857
artefacts resembling ova of, 765
cause of otitis externa, 765
diagnosis
modified cellophane method, 857
dust-borne, 1071
infection
in Durban, 751
Esquimos, 376
Kenya, 70
Portuguese Guinea, 844
Rome, 1071
modes of infection, 960
retrofection by, 960
swab for detecting ova, 765
treatment
Contraverm, 961
diarrhoea cataract, 1072
gentian violet, 70, 656
phenothiazine, 656, 961, 1166
Reconox, 1166
Enteromonas
hervei n. sp. in stools, 367
hominis see also Tricercomonas intestinalis
Entomological Conference, Commonwealth, report, 978
Entomological material, new staining formula, 293
studies in Venezuela, 505
ENTOMOLOGY AND INSECTICIDES: GENERAL, 92-95, 171-177, 287-293, 403-412, 499-501, 578-584, 672-676, 875-878, 974-976, 1087-1089, 1186-1188.
Eosinophilia
pulmonary
ascariasis and, 1062
tropical, *see also* Eosinophilosis, pulmonary
in Cuba, 872
Curaçao, 67
India, (400)
Korea, 872
acariasis and, 577
causation, 872
filariasis and, 67
treatment
arsenicals, 57
Eosinophilic lung, 784
treatment
acetylarsan, 784
mapharside, 784
respiratory syndrome, 577
Eosinophilosis, pulmonary
in Assam, 400
Bengal, 400
Burma, 400
treatment
arsenicals detrimental, 400
Epidemic dropsy, 866
Epidermophyton floccosum infection in Singapore, 1077
Eriopon, wetting agent for staining blood-parasites, 502
Erythema
centrifugal annular, diagnosis from leprosy, 369
nodosum, diagnosis from leprosy, 369
polymorphic exudative, diagnosis from leprosy, 369
Erythrocyte sedimentation rate in relapsing fever and epidemic typhus compared, 45
Essential hypertension in Curaçao, 970
Eucalyptus extract as molluscicide, 266
Eufilaria sergenti in Algerian sparrows, 448
Eulaelaps stabularis on rats in Mexico, 819
Euparyphium
ilocanum in man in Malayan Archipelago, 63
malayanum in man in Malayan Archipelago, 64
Eutriatoma maculata in Netherlands Antilles, 876
Eutrombicula
alfreddugèsi, geographical distribution in U.S.A., 176.
batasas, geographical distribution in U.S.A., 176
masoni, geographical distribution in U.S.A., 176
Fabrics, subjective reactions to physical characteristics of, 85
Faraco's method of staining *M. leprae* in sections, 1149

Fasciola hepatica
as cause of tropical eisinophilia, 872
concentration of ova by continuous sedimentation, 950
drugs, action on, 760
experimental development in *Lymnaea stagnalis*, 850
in a muscle abscess, (560)
infection
in Cuba, 271, (649)
France, (153)
Costa Rica, 153
Madeira, 62
Portugal, 62
Spain, 62
Texas, 62
from lettuce, 62
watercress, 62, 1159
diagnosis, 271
CHR test in cattle, 1156
duodenal intubation, (380)
family outbreak, 1159
prophylaxis, 271, 272
treatment
emetine, 63
glucantime, 1159
surgical, (380)

Fascioliasis, diagnosis by intradermal reaction, 760

Fasciolopsis buskii infection
in Tonking, 153
man, 153
pig, 153

Fièvre rouge congolaise, 459

FILARIASIS *see also Wuchereria, Loa, Dracunculus, Dirofilaria*
in Anglo-Egyptian Sudan, 956
Aruba, 675
Borneo, 67
British Cameroons, 563
Guiana, 589, 654
Ceylon mosquitoes, 486
Costa Rica, 562
Ecuador, 573
Martinique, 274
New Caledonia, 155
Porto Rico, 762
Portuguese Guinea, 1013
Virgin Islands, 1066
allergy, 836
Bancroftian, nightly parturition not proven, 274
of breast simulating carcinoma, 1064
chemotherapy of, 1161
control
in British Cameroons, 564
DDT, 1066
elephantiasis and, 385
experimental, in cotton rat, 488
of frogs, chemotherapeutic studies, 959
genital manifestations, 155
malaria and yellow fever in British Guiana [GIGLIOLI] (book review), 183

Filariasis—*cont.*
treatment
anthiomaline, 1162
arsenamide, 1164
cyanine dyes, 1163
Hetrazan, 156, 562, 654, 855, 1064, 1065, 1163
neostibosan, 1162
pentavalent antimonials, 1164
arsenicals, 1164
phenyl arsenoxide, 68
piperazine compounds, 1163
trivalent antimonials, 1165
arsenicals, 1162
tropical eosinophilia in, 67
tropical lymphangitis and, 274
with tuberculosis, 1068

Filaricides, cyanine dyes, 763

"Flagging method" of collecting Trombiculid larvae, 133

Fleas
control of diseases transmitted by, (501)
repellents, laboratory evaluation, (95)
of rodents in California, 630
South America, 291
toxicants, laboratory evaluation, (95)

Flies
blood-sucking
in Africa, Portuguese East, 531
Manitoba, 580
Portuguese Guinea, 531
as disseminators of *E. histolytica*, 937

Folic acid
in macrocytic anaemia, 80, 81
pernicious anaemia, 80
sprue, 80
synthetic, *see* Pteroylglutamic acid compared with liver extract in haematological response in sprue, 965

Food poisoning, action of acetic acid on bacteria, 830

Foréami, report of activities in 1946 and 1947, 785

Fouadin *see* also Stibophen

Fowl as natural host of Echinostome in Java, 63

Fraxinus
chinensis in *P. vivax* malaria, 611
mallacophyla in malaria, 611

Fungal granulomata of man in the tropics and subtropics [REDAELLI and CIFERRI] (book review), 281

Fungicides
methods of analysis, (1089)
specifications, (1089)

Fungus diseases, need for study of, 395
infections, treatment of, in soldiers in the tropics, 1077

Furacin *see* Lactones

"Gambiae Eradication Service" in Egypt, 438

"Gamorial" for Anopheles control, 1121
German Tropical Doctor, A. [KLEINE] (book review), 1101
Giardia
intestinalis
in dysentery epidemic, 547
effect of diodoquin on, 469
infection
in Alberta, 677
Esquimos, 376
French children, 941
Kenya, 641
Portuguese Guinea, 845
returning forces, 362
Scioa, 1033
following clonorchiasis, 648
treatment
emetine, 834
muris in rodents of Asmara, 1161
Glossina
of Anglo-Egyptian Sudan, 532
French West Africa, distribution of, 921
the Gambia, 288
the Gold Coast, 223, 226
Nigeria, 225
Northern Rhodesia, soil and, 100
Portuguese Guinea, 531
Sierra Leone, 227
West Africa, use of traps for, 618
biology of, 1014
control
agricultural methods, 922
DDT, 922
in East Africa, 233
human settlement, 229, 234, 1128
in Uganda, report for 1947, (922)
in West Africa, 223, 224
cross-breeding between, 18
eradication, ineffectiveness of traps, 618
habitat requirements, 336
hybridization of, 1014
infection rates in Portuguese Guinea, 1127
mechanism of feeding, 515
Glossina
austeni in Kenya, night activity of, 337
brevipalpis in Kenya, 237
caligenia in Nigeria, 226
fusca in Sierra Leone, 227
fuscipleuris in Kenya, 237
longipalpis
in the Gambia,228
the Gold Coast, 226
Nigeria, 225
Sierra Leone, 227
trypanosome infection rate in Portuguese Guinea, 1127
vector of trypanosomes in Portuguese Guinea, 1013
morsitans
in French West Africa, distribution of, 921
the Gambia, 228
the Gold Coast, 221, 226
Nigeria, 225
campaign against, in Portuguese East Africa, (619)
effect of human settlement on, 1128
length of survival in nature, 1015
Glossina—cont.
morsitans—cont.
subspecies and races of, 1013
nigrofusca in Gold Coast, 226
pallidipes in Kenya, 237
effect of humidity on activity of, 617
sunlight on activity of, 617
temperature on activity of, 617
influence of climatic factors on activity of, 617
palpalis
in Fernando Pó, 124
French West Africa, distribution of, 921
Gambia, 228
Gold Coast, 226
Nigeria, 225
Sierra Leone, 227
control
agricultural methods, 922
defensive clearing, 223
infection by *T. grayi*, 1127
laboratory cultivation, 122
"selective clearing", 19
trypanosome infection rate in Portuguese Guinea, 1127
use of traps for, in W. Africa, 618
vector of trypanosomiasis in Fernando Pó, 124
Portuguese Guinea, 1013
submorsitans
trypanosome infection rate in Portuguese Guinea, 1127
vector of trypanosomes in Portuguese Guinea, 1013
swynnertoni in Kenya, 235, 237
length of survival in nature, 1015
tachinoides
in French West Africa, distribution of, 921
Gold Coast, 226
Nigeria, 225
North-east Africa, 532
control
agricultural methods, 922
defensive clearing, 223
use of traps for, in W. Africa, 618
Glossitis
nutritional, effect of injection of animal protein factor concentrate, 1073
vitamin deficiency and, 657
Glucantime (2168 R.P.) in kala azar, 341
Glyciphagus and tropical eosinophilia, 577
Gnathostoma
hispidum infection
in China, 1070
Japan, 1070
Malayan animals, 857
ocular, 1070
spinigerum infection
in China, 1070
Siam, 1069
by larva in Malaya, 857
life-cycle, 1070
location in the human body, 1069
symptoms, 1069
Gnathostomiasis
in Malaya, 1071
human in Malaya, 857

Goitre in Africa, (874)
Grey-wedge photometer for estimation of haemoglobin, 663
Grundriss der medizinischen Entomologie [WEYER] (book review), 193
Grundriss der Protozoologie für Ärzte und Tierärzte [REICHENOW] (book review), 194
Grundriss der Tropenkrankheiten [VOGEL] (book review), 192
"Gruyère cheese appearance" in the nerves in leprosy, 148
Guide to Pacific Island Dietaries [BUCHANAN] (book review), 886
"Gyron", a mosquito larvicide, 523
Habel mouse test for antigenic potency of rabies, virus, 824
Haemagogus spp.
biology in S. America, (933)
anastasionis attacking man in Curaçao, 1088
argyromeris breeding in Bromeliads, 1139
capricorni, yellow fever virus and, 1027
spegazzinii, yellow fever virus and, 1027
uriartei breeding in Bromeliads, 1139
Haemaphysalis
cinnabarina punctata in U.S.S.R., 249
concinna in U.S.S.R., 248
HAEMATOLOGY, 77-81, 165-166, 280, 392-393, 489-493, 566-568, 661-666, 771-775, 863-865, 966-977, 1073-1076, 1167-1169
Haematology, Bacteriology and Parasitology [STITT] (book review), 185
biopsy of human bone marrow, (489)
blood picture of healthy Europeans in South Africa, 77
comparison of Europeans and Africans, infected with malaria in Nairobi, 432
erythrocyte counts, errors in, 490
folic acid metabolism, (165)
investigation among soldiers in Iraq, 771
malaria infection in Europeans and Africans compared, 432, 491
laboratory methods, errors of, 489
meat ration and blood levels, 771
normal blood standards in Kenya, 491
rapid panchromic stain, 96
Haematopota sp.
importance as vectors of disease, 875
possible vector of *Loa loa* in Anglo-Egyptian Sudan, 957
Haemoglobinuria
after bee-stings, 569
in monkeys after *P. knowlesi* infection, 810
Haemophilia in a Bantu, 1169
Haemoproteus
in Algerian sparrows, 448
South Carolina birds, 616
buteonis in Swedish birds, 615
infection, treatment with endochin, 220
Haemosporidia, mammalian, 798
Hamster, suitable animal for experimental Schistosomiasis mansoni, 948
Handbook for the Identification of Insects of Medical Importance [SMART, JORDAN & WHITTICK] (book review), 300
Handbook of practical Colonial Information; Incidence of Diseases and Medical Facilities; Acclimatization of Europeans in Africa [MÜHLENS, GROBER, *et al.*] (book review), 594
Haplosporangium parvum infecting *Scapanus townsendii* in Canada, 496
Harpagomyia taeniarostris breeding in plant axils, 173
Harvest mite, unsuitability of name for vector of scrub typhus, 247
Health and Agriculture in Central Africa, 179
conditions in Brazil, 1190
Missions of United States to Liberia, 587
Service Programme for Mandated Islands of Micronesia, 585
Heat effect of pituitrin on work, 871
humidity and, physiological reaction, 497
production and body weight, (497) (*bis*)
HEAT STROKE AND ALLIED CONDITIONS, 84-86, 168-169, 284-285, 497, 671-672, 780-781, 871.
Heat stroke, Psychosis from, 84
diagnosis, 85
subjective reaction and physical characters of fabrics, 85
sunburn
protectives
Bixa orellana, 671
Liquidambar styraciflua, 671
orellina, 671
tropical
anhidrotic asthenia, 780
protection
tent canopies, 672
sweat, chloride loss in, 168
Helisoma duryi intercalare in Dutch Antilles
HELMINTHIASIS, 53-71, 150-157, 265-277, 376-388, 480-489, 553-565, 641-657, 751-766, 844-859, 946-962, 1054-1072, 1152-1166
in Alberta, man and dogs at Fort Chipewyan, 677
Brazil, 485
Chengtu, Szechuan, dogs, 376
Colombia, 1055
Ecuador children, 573
Germany, 1054
Okinawa, 154
the Philippines, 152
North-west Territories, 376
South Africa, 751
veterans of World War II, 61
as cause of death in Venezuela, 752

Helminthiasis—*cont.*
diagnosis
CEX concentration method, 1152
concentration method for ova, 53
faecal examination, direct v. concentration methods, 1055
modified Telemann technique (AEX), 53
enumeration of ova, modification of Stoll's method, 642
immunity and, 380
increase in Germany by irrigation schemes, 1054
parasitic worms, vitamins of, (486)
Helminthiasis, Summary of Recent Abstracts, 687-695, 791-796
survey
in Kenya, 641
Okinawa, 154
testing anthelmintics on *Nippostrongylus muris*, 751
treatment, 1056
Hetrazan, conflicting reports on, 958
Miracil, (59)
tetrachlorethylene, drawbacks in rural districts, 485
Helminth(s)
of medical and veterinary interest, catalogue of, 981
parasites of man and food mammals in Egypt, (946)
toxic extracts of, 851
substances in, 850
Henry and Soberón reaction in malarial reticuloendotheliosis, 320
Hepatitis, amoebic, complicating pulmonary tuberculosis, 363
treatment, combined, 363
Hepatocystes
kochi, 615
asexual stages in liver of monkeys, 798
vassali, in Malayan squirrels, 808
Hepatozoon muris in rodents of Asmara, 1161
Hermann M. Biggs Memorial Lecture, (583)
Hetrazan, allergic response to, 1066
in filariasis, 654, 856
helminthiasis, conflicting reports on, 958
mode of action in filariasis, 156
in onchocerciasis, 855
Hexylresorcinol, vermicidal activity of, 54
Hippelates
flaviceps, possible vector of epidemic conjunctivitis, 1082
impressus, possible vector of epidemic conjunctivitis, 1082
spp., vector of *T. carateum*, 869
Histoplasma capsulatum
antigens, 166
complement fixation, 167
cross-reactions with *Blastomyces dermatitidis*, 869
histoplasmin
agglutination of sheep's cells after sensitization, 779
and blastomycin compared, 779
formation by, 494
in tissues of wild rats, 495
isolated from spleen puncture, 84
Histoplasma capsulatum—*cont.*
isolation from soil, 1080
nasal infection, 778
oral infection, 778
precipitation tests, 166
relationships with *Blastomyces dermatitidis*, 396
Paracoccidioides brasiliensis, 396
yeast-form cultures for complement fixation antigen, 83
Histoplasmin sensitivity in Newfoundland students, 778
Histoplasmosis, a review, 1079
in Argentine, 968
Australia, 397
Batavia, 869
Californian children, 570
South Africa, 570
Turkey, 84
Uruguay, 896
Virginia, U.S.A., wild rats, 495
collodion agglutination test, 870
complement fixation in, 83, 396, 869
experimental
alimentary tract infection, 778
nasal infection, 778
histoplasmin, cross-reaction with coccidioidin, 1172
sensitivity to, among cattle, 1171
test, 397, 570
observations on a case of, 869
symptoms and pathology, (780)
of tongue, 968
History, medical, of the war in Malaya, 879
Holarrhena africana (*floribunda*) in amoebiasis treatment, 365, 832, 1037
Hookworms, *see under Ancylostoma*, ankylostomiasis, *Necator*
Hoplopsyllus anomalus and plague in California, 631
Hot Countries, Diseases of, [DUBOIS AND VAN DEN BERGHE] (book review), 298
Horseflies as transmitters of disease from animals to man, 875
Houseflies
behaviour to humidity and temperature, 578
control
comparative toxicity of chlorinated compounds, 500
residual effectiveness of DDT against, 583
Hyalomma
experimental revision of, 876
excavatum of sheep found on man, 1089
mauritanicum, natural infection by *R. burneti*, 822
Hyalopus see Cephalosporium
Hydatid disease
in America, 650
Argentina, (1062)
Chile, 852, 951
Ecuador, 573
Uruguay, 383
bibliography in Spain and Portugal, (382)

Hydatid Disease [DÉVÉ] (book review), 1099
of the Bones, [DÉVÉ] (book review), 1099
of bone, 383
cardiópericardial, (65)
cerebral, diagnosis, (382)
of eye, (561)
kidney, 383
liver, 382
calcified cyst of, (65)
cirrhosis and, 1061
lungs, (65), 382
spleen, 383
unusual sites, 484
vertebral, (382)
complications and sequelae, 383
Echinococcus cyst, recurrence after marsupialization, (65)
fluid, toxic action of, 851
prophylaxis, (1062)
relation to biliary lithiasis, (485)
renal, partial nephrectomy for, (1161)
Roentgen picture, 382
Second International Congress, at Buenos Aires, 1160
Hygiene and Tropical Diseases Institute, Mexico, report, (880)
Morocco Institute, report for 1947, 1096
Hygrophyla sp., larvae of mosquitoes and, 67
Hylesia causing dermatitis in tropical America, 282
Hymenolepis
in animals at Rome Zoological Gardens, 179
diminuta infection
in Asmara rodents, 1161
Durban, 751
Venezuela, 273
nana infection
in Durban, 751
France, 951
Venezuela, 273
returned soldiers, 61
var. *fraterna*
in Asmara rodents, 1161
Hypoderma bovis causing intra-ocular myiasis, 1179
Hypsirrhina enhydris, sparganosis and, 64
Icosiella neglecta, chemotherapeutic studies on, 959
Impetigo in Calcutta, 570
Indalone as mosquito repellent, 1188
India, Public Health Commissioner's report for 1946, 982
Indices of fascioliasis endemicity
Cercarial index, 272
Hepatic-Fasciola index, 272
Malacological index, 272
Ova-faeces index, 272
Inermicapsifer spp., discussion of life-cycle, 953
Insects
control
in California, 174
Central American Highway, 441
benzene hexachloride, 500, 879
biological, 980
chlordane, 500
chlorinated camphene, 500, 524
DDT, 500
by aerial spray, 174
from aircraft, (583)
in military hygiene, 443
plans for, in California, 500
residual deposit tests, 501
space spray tests, 501
treatment of clothing, 820
insecticides
action and chemical constitution, (412) (*bis*)
aerial application, 172, 979
chlordane, 500, 524, 613, 879
DDD, DDT, chlordane and chlorinated camphene compared, 524
DDT, (94), 613, 818, 877
action on *Musca domestica*, 291
analogues of, (411), 878
biological activity of, (410) (*bis*)
commercial, (94)
compared with dichlorodiphenyl, 412
dispersible powder, 438
economic considerations, 332
evaluation of residual effectiveness, 583
medical and public health importance of, (583)
method of assessing acaricidal properties of, 292, 293
myiasis and, in Guadeloupe, 171
preparation in laboratory, (94)
residual toxicity, 878, 897
sorption by chitin, 291
type compounds, (1089)
dispersal equipment, developments in, 708
Gammexane, 20, 613
dispersible powder, 440, 613
method of assessing acaricidal properties of, 293
history of, in the Army, (1089)
methods of analysis, (1089)
modern review of, 877
parathion, 412
piperonyl butoxide, toxicity of, (584)
recent developments, 979
residual, Ross Institute Advisory Committee Bulletin, 879
benzene hexachloride, 879
effectiveness compared, 524, 525
SNP, 1131
specifications, (1089)
spinning-disk sprayer, 411
sprayer for use in rural areas, 411
spraying, improved methods, 1120
testing, proposed technique for, 404
toxicity of mixed poisons, (293)

Insects—*cont.*
control—*cont.*
repellents
history of, in the Army, (1089)
modern review of, 877
Mylol cream, 564
organic, physical properties of, (676)
Picrasina, 671
proposed technique for testing, 404
Simaruba, 671
urucú, 671
Culicines; Contributions to the Knowledge of the Danish and Fennoscandian Mosquitoes, Culicini, [NATVIG] (book review), 287
cuticle, (403)
human diseases transmitted by, (401)
ingested blood, precipitin sera for detection of, 410
mounting of small, 582
vectors
eradication
in Brazil, 877
Cyprus, 877
Egypt, 877
Kenya, 877
Sardinia, 877

Insect-borne diseases
eradication of vectors of, 877
prevention of, 583

"Institution Sprayer" for insecticides, 708

International statistical classification of diseases, injuries and causes of death, 1002

Iodameba, intestinal, in animals at Rome Zoological Gardens, 179
bütschlii
in Alberta, 677
New Guinea, 41
returning forces, 362
effect of diodoquin on, 469

Ipomoea reptans and mosquito larvae, 67

Ipsen's method of testing potency of antivenenes, 394

Isoquinolines, chemistry of, (706)

Isospora
belli infection, coincident with *A. duodenale* 1148
bigemina, in dogs in Alberta, 677
hominis infection
in China, 261
Japan, 261
Kenya, 641
Rome, 942
South-west Pacific, 261
associated with *E. histolytica*, 942
experimental, 261
symptoms, 261

Ixodes persulcatus in U.S.S.R., 249

Jack-rabbit *see Lepus californicus merriami*

Kangkoeng *see Ipomoea reptans*, 67

Karagwe (Bukoba District) Tanganyika, history of, 504

Katayama
cantoni, host of *S. japonicum*, 559
fausti, host of *S. japonicum*, 559
formosana, host of *S. japonicum*, 559
lii, host of *S. Japonicum*, 559
tangi, host of *S. japonicum*, 559

Kenya, report on water resources, 676

Kerato-conjunctivitis due to *Calotropis gigantea*, 1177
in Hawaii, 1177

Kerteszia breeding in Bromeliads in Trinidad, 320

Koch, Robert, professional life of, 100

Kwashiorkor
in Belgian Congo, 1166
India, 163
South Africa, 159
ankylostomiasis and, 665
cirrhosis of liver and, 390
discussion on, 768
fatty infiltration of liver in, 769
pancreatic atrophy in, 769
treatment
folic acid, failure of, 1167
ventriculin, failure of, 1167

Laboratory breeding of *A. punctulatus punctulatus*, 1001
clinical, La Saline, report, 988
coproculture, new methods, 977
Manual for Physicians, Aids in Diagnosis and Treatment. [NEW YORK STATE DEPARTMENT OF HEALTH] (book review), 192

LABORATORY PROCEDURES, 95-96, 177, 413, 502, 976-977, 1090
rearing of termites, 975
staining and mounting insects and metazoa, (413)
stool enrichment methods, Carle & Barthélémy, 977
Telemann, 977
York & Bidegarry, 977

Lactones, antibiotic,
trypanocidal action, 921
wide distribution in nature, 921

Laelaps
bacoti, reduction by dusting with DDT, 247
nuttalli on rats in Mexico, 819

Laruscus sp., exoerythrocytic forms of *P. vassali* in, 808

Lathyrism in Valniarka, 90
biochemical causes, 169
selenium as possible cause, 170
symptoms, 399

Lathyrus
aphaca
nutritive value of, 399
toxicity of, 399
cicera
nutritive value of, 399
toxicity of, 399
hirsutus
nutritive value of, 399
toxicity of, 399

Lathyrus—cont.
odoratus
nutritive value of, 399
toxicity of, 399
sativus
cause of outbreak at Vapniarka, 90
nutritive value of, 399
toxicity of, 399
sphaericus
nutritive value of, 399
toxicity of, 399
sylvestris Wagneri
nutritive value of, 399
toxicity of, 399
tingitanus
nutritive value of, 399
toxicity of, 399

Latrodectus
geometricus in Argentine, 968
mactans in Argentine, 968
bites by, cutaneous effects, 1169
revivensis, characters of, 1169

"Lazarine", definition of term, 1053

Leishmania spp.
criteria of differentiation, 621
nomenclature of, 621

Leishmania brasiliensis
in South America, 127
donovani, cultures, effect of hyaluronic acid and hyaluronidase on, 549
cultures, purification by antibiotics, 534
electrophoretic studies on hamsters infected by, 925
preservation by inoculation of fertilized eggs, 1018
survival in *Ornithodorus moubata*, 1018
in *Triatoma*, 21
tropica in *Triatoma*, 21
infectivity and immunity, 449

LEISHMANIASIS (*see also Leishmania* spp.), 21-22, 126-129, 242-244, 340-343, 449-450, 535-536, 621-623, 714-715, 815-817, 924-926, 1018-1021, 1132-1134
in Africa, East, (1133)
North, 1132
Cercopithecus aethiops, 815
Colombia, 622
hamster, effect of diet on course, 450
South America, 127
canine
in China, 129, 342
Sicily, 128
cutaneous
in Abyssinia, 343
Adriatic Coast, 1134
Arbruzzi, 1020
Brazil, 714
China, 244
Costa Rica, 342
French Sudan, 816
soldiers returned to U.S.A., 777
Spain, 126
United States of America, 450
classification, 342
diagnosis, by culture, 1020

Leishmaniasis—*cont.*
cutaneous—*cont.*
epidemiology on Adriatic Coast, 1134
generalization, 714
resemblance to craw-craw, 816
leprosy, 1134
treatment
antimonials, 342
atebrin, 342
Bogalita, 926
eparseno, 343
Rongalita C, 926
sulphamide, 342
tartar emetic, 816
kala azar
in America, 816
Bombay, 622
Calcutta, 242
China, 129
Dodecanese, (340)
India, 925
Punjab, 126
repatriate from Tunis, 340
Spain, 126 (*bis*)
Tunisia, 341
United States ex-servicemen, 340
activation by battle experience, 21
of latent, by malaria, (15), 22
relapsing fever, (15), 22
acute endocarditis in, 340
anaemic syndrome in, (924)
delirium in, (924)
diagnosis
HCl gelification, 128, 1018
myelogram in, 1019
polycythaemia in, 242
purpura in, (815)
sero-diagnosis, 127
serum iron in, 1018
spleen cells in, 1019
splenogram in, 1019
target cells in, 1019
transmission by transfusion, 341
treatment
glucantime (2168 R.P.), 341, 622, 924, 1019
hydroxystilbamidine, 1134
pentamidine isethionate, 925
splenectomy in drug-resistant cases, 243
stilbamidine, neuropathy following, 1133
urea stibamine, 815
without demonstrable parasites, 1132
infantile
in Spain, 126 (*bis*)
Turkey, 21 (*ter*)
treatment by lomidine, 1020
muco-cutaneous, in Brazil, 343
treatment by eparseno, 343

Leishmaniasis, Summary of Recent Abstracts, 509-512
treatment
chloroquine, 623
Triatoma not a vector, 21
vectors in South America, 127

Leonitis nepetaefolia in control of avian malaria, 447

Leontocebus chrysomelas, variation of antibodies to yellow fever in serum of, 137

Lepromin
allergy and reaction to tuberculin, 1150
test in subsidised lepromatous cases, 368
reaction of non-leprous persons, 369

LEPROSY, 45-53, 146-149, 263-265, 368-376, 476-480, 552-553, 638-641, 745-751, 840-844, 943-946, 1050-1054, 1148-1152
in Belgian Congo, 146
Brazil, 49, 1148
prophylactic service, 53
British Guiana, 263
nationals, (47)
West Indies, 263
Calcutta, 570, 745
Colombia, 552
Cuba, 842
Ecuador, 573
Esthonia, Livonia and Courland, (751)
French Guiana, 477
Guadeloupe, (148)
Hawaii, 479
India, 45
Jamaica, 263
Kenya, 638
Nigeria, 265
Portuguese Guinea, 1013
Queensland, 841
soldiers returned to U.S.A., 777
Trinidad, 263
Uganda, 263
Western Australia, report of Commissioner of Public Health, (368)
allergic response of children to BCG, 1150
antagonism of tuberculosis, 1052
bacilli
nature of globus, 943
silvering of, in tissues, 943
blood picture in, 746
bone marrow changes in, 47
children
" Healthy Homes " for, 46
" Infectious Homes " for, 46
" Observation Homes " for, 46
classification, (369), (747)
and nomenclature, 53
difficulties, 264
new official, 840
clinical forms, (369)
subdivision, 841
contacts
bacilli in skin of, 1052
control, (480) (*bis*)
agricultural colonies, 52
dispensaries, 53
home visits, in Bombay City, 373
isolation, modern conceptions of, 374
legislative, in India, 374
sanatoria, 52
suggested method in British West Indies, 263

Leprosy—*cont.*
crossed premunition with tuberculosis, 1052
cutaneous lesions, effects of X-rays, 51
diagnosis, 375
absence of induced pruritus, 148
anidrosis test, 478
bacteriological and serological methods, (368)
differential, 369
early, preclinical, 149
hypertrophy of superficial nerves, 148
mecholyl test, 478
radiology of ulnar nerves, 478
epidemiological study in Belgian Congo, 146
factors in public health control, 375
Fifth International Congress, 52
histopathological lesions, 477
histopathology of, (746)
nerve centres, 46
Hollande's sero-agglutination technique, (148)
homes for children, 45
human, inoculated into rats, 745
hypertrophic neuritis, treatment, surgical, 1152
immunity to, and BCG vaccination, (148)
" Indeterminate " cases, (47)
group defined, 840
infection influenced by exposure rather than age, 1149
institutions in Brazil, (480)
latent leprides activated by tuberculin injection, 1151
lepra reactions over skin graft, (48)
sulphones and, 50
treatment
tartar emetic, 149
testosterone propionate, 1053
lepromatous
histology of cutaneous nerves, 1051 (*bis*)
nerve changes, 147
type defined, 840
lepromin reaction in, 368
lesions, change of type, 264
Makogai Hospital report, 1947, 638
management of, (641)
myocarditis in, 843
national campaign against in Brazil [AGRÍCOLA] (book review), 680
nervous symptoms in, 641
neuralgias, use of hypospray, 51
observations on patients in Holland, 368
ocular lesions, failure of promin in treatment, 1151
Organization and Management of Preventoria [DE SOUZA CAMPOS & BECHELLI] (book review), 682
orthopaedic surgery in, (149)
pathogenicity in lesions, (147)
pathology
bone changes under sulphone therapy, 50
changes in, with sulphone treatment, 746
plantar lesions, perforating, (369)
prophylaxis, 375

Leprosy—*cont.*
in rats
cultivation of organism, (375)
effect of streptomycin, 375
Stefansky's bacillus
action of promin on, 945
cultivation of, 1050
development in chick embryo, (945)
transmission to mice, 1054
report of Calcutta Conference, 1948, 943
reticulum in different types of, 1051
serological reactions in, 944
serology review, (369)
simulated by cutaneous leishmaniasis, 1134
social aspect of, in Brazil, 1148
"spotted" of Lucio, 1053
staining tissues, choice of fixative for, 478
study of sputa of tuberculous patients, 1150
Summary of Recent Abstracts, 993-999.
Symptomatology of the Nervous System [De Souza Campos & Bechelli] (book review), 681
transmission, (477)
Treatise of, [Maurano *et al.*] (book review), 678
treatment
advances in, 52
assessment of results, (372)
Belivron, 50
Bogalita, 944
Caloncoba seeds, oil of, 944
chaulmoogra oil, 370, 371
critical review of, (372)
long *v.* short interrupted periods, 371
and promin compared, 48
sulphones compared, 843
diasone, 48, 372, 479, 553, 748, 841
blood changes in, 480
shock symptoms after, 639
Hydnocarpus, (479)
oil, 48
preparations, optimum dosage of, 370
and sulphones compared, 747
hypospray, 51
leprolines, 749, 750
methylene blue, for lepra reactions, 149
of ocular lesions, (51)
physical therapy, 265
promanide, 552
promin, 48, 373, 479, 552, 748, 841
in laryngitis, 479, 844
lepromatous type, 479, 552, 1053
neuromacular, 552
tuberculoid type, 479
and chaulmoogra compared, 48
promizole, 49
in laryngitis, 479
streptomycin, 749
and chaulmoogra, 372
sulphetrone, 48, 553
sulphones, 47, 48, (265), 372, 479
in French Guiana, 748 (*bis*)
bone changes under, 50
experimental work on, 747
importance of marrow examination, 47
risks in neuromacular, 943
surgical, (1152)
tracheotomy, indications for, 844

Leprosy—*cont.*
treatment—*cont.*
vitamin D in large doses in tuberculoid type, 640
X-rays, 51
tuberculoid
histology of cutaneous nerves, 1051
a generalized condition, 370
type defined, 840
variety of lesions in, 149
visceral lesions in, 370
ulcer, perforating, of sole, 47
treatment, 48
by leprolines, 750
welfare work, (750)

Leptopsylla segnis
on rats in Mexico, 819
City, 499
reduction by dusting with DDT, 247, 347
Rickettsia burneti and, 541
susceptibility to infection by *R. mooseri*, 818
R. prowazeki, 818

Lepus californicus merriami as reservoir host of *F. hepatica* in Texas, 62

Lester Smith's crystalline antipernicious anaemia factor, 166

Leucocytozoon in S. Carolina birds, 616
sakharoffi, studies in Swedish birds, 615
simondi, 615

Leucoderma in Calcutta, 570

Leucomelanoderma, diagnosis from leprosy, 369

Liberia, chief diseases of, 587

Lice
control, 245
of diseases transmitted by, (501)
rectal feeding for Rickettsia cultivation, 1022

Lichen planus, atypical in Palestine, 868

Liponyssus
bacoti
experimental chemoprophylaxis, 488
on rats in Mexico, 819
City, 499
rearing in laboratory, 387
reduction by dusting with DDT, 247, 347
transmitter of *R. akari* in laboratory, 248
bursa, SNP as insecticide, 1131

Litomosoides carinii
chemoprophylaxis of experimental filariasis, 488
effect of cyanine dyes on metabolism of, 1163
importance in filarial investigation, 1162
infection in cotton-rats, 69
life-history of, 762
maintenance for investigation, 386
metabolism of, 763
migration of larvae, 959
test insect for filaricides, 763 (*bis*)
treatment
arsenamide, 68
Hetrazan, 156

Liver cirrhosis
associated with hydatid, 1061
diet and, in Ceylon, 161
(non-schistosomal) in Egypt, (59)
in infants, 76
Jamaica, 76
malaria, 433
toxic, 161

Loa loa
allergy, 386
infection
in Anglo-Egyptian Sudan, 957
British Cameroons, 563
French Cameroons, 1066
treatment
Hetrazan, 275, 957, 958, 1066, 1165

Loeffler's syndrome
ascariasis and, 486, 1062, 1183
Ascaris lumbricoides and, 871

Loiasis, treatment by oxophenarsine, 960

Louse as subject in chemotherapeutic tests in typhus fever, 537

Loxosceles laeta, bites by, cutaneous effects, 1169

Lucilia
caesar, causing intestinal myiasis in Chile, 1087
pallescens and transmission of *E. histolytica*, 937

Ludwigia palustris and cultivation of *B. truncatus*, 946
P. boissyi, 946

Lutz's disease see *Paracoccidiodides brasiliensis* infection

Lutzsimulium cruzi, 171

Lycosa murina, bites by, cutaneous effects, 1169

Lymnaea
cubensis, vector of *F. hepatica*, 1058
on watercress, causing outbreak of fascioliasis in Cuba, 271
peregra
control
BHC and copper sulphate compared, 1057
rubiginosa, second intermediate host of Echinostome in Java, 63
stagnalis, intermediate host of *F. hepatica*, 850
vector of cercariae causing Swimmers' itch, 849

Macaca nemestrina, infection by *Balantidium coli*, 261

Madura foot
in Argentine, (869)
Lombok (Sunda Islands), 494
Netherlands East Indies, 83

Malachite as molluscicide, 266

MALARIA, 6-18, 103-120, 205-221, 314-335, 425-448, 513-528, 601-616, 695-711, 797-810, 896-913, 999-1012, 1103-1127

Malaria—*cont.*
in Agro Romano 1943-47, 427
Alsace, 113, 696
Amazonia, 331
Argentina, 332
Belgian Congo, 214, 428, 601, 699, 897, 908
Bengal, 109, 612
Boca del Rio, Mexico, 806
Bombay, 436
Borneo, 909
Brandenburg Province, 426
Burma valleys, 210
Calcutta, 325
Cambodia, 513
Cape Verde Islands, 208
Central Africa, 428
Chile, 1008
China, 428, 519
Cochin-China, 328
Corrientes Province (Argentine), rarity of, 1000
Corsica, 315
Cyprus, 16
Ecuador, 573
Egypt, 438
El Salvador, 6
Eritrea, 213, 705
Europe 1938-1947, 425
Finland, 205
infection by hibernating mosquitoes, 205
France, 112, 695, 999, 1103
Germany, 426, 696
Guayaquil (Ecuador), (317)
Hungary, 896
India, 16, 17, 109
Bengal, 109, 612
Bombay, 436
Fort Sandeman, 11
Punjab, 6, 110
Indo-China, 206, 705
Isle of Elba, cause of increase, 315
Italy, 8, 109, 114, 315, 427, 513
Japan, (429)
Kenya, 432, 606, 898, 1104, 1114
Macedonia, 316, 1114
Mexico, 429
Morocco, 1096
Moselle, 696
Netherlands, 314
East Indies, 110
New Guinea, 602
Panama, 114
Peruvian coast, 805
Philippines, 1003
Poland, 999
Russia, among German soldiers, 426
Sardinia, 117, 606
Southern France, 1103
Spain, 427
Sweden, 205
Thrace, 316
Uganda, 9, 10
Upper Silesia, 426
U.S.A., 111
Venezuela, 6, 210, 211
Veracruz, Mexico, 898

Malaria—*cont.*
Rio de Janeiro, 513
repatriated P.O.W., 113 (*bis*)
returned soldiers, 905
accidental infection, 999
activation by battle experience, 21
of latent kala azar by, (15), 22
age-group infection in hyperendemic areas, 602
allergic symptoms in, 519
anomalous form at high altitude, 1104
Anopheline survey in Salerno, 8
antimalaria drugs, (907)
criteria of tolerability, 904
measures, modern, 1007
associated with dysentery, 606
avian
action of paludrine inhibited by pteroylglutamic acid, 1124
in canaries
Plasmodium cathemerium
exoerythrocytic development of, 1126
relictum, in culture, 18
in chicks
adrenal hypertorphy, 809
ascorbic acid in adrenals of infected chicks, 1011
Plasmodium elongatum, factors affecting exflagellation, 335
gallinaceum
acquired resistance to drugs, 446
exoerythrocytic infection, 334
infection
delaying action of proguanil, 911
infectivity of exoerythrocytic forms, 445
invisible stage of, 334
infection prophylaxis by proguanil, 911
sulphonamides, 911
reaction of proguanil-resistant strains to sulphaguanidine, 912.
staining of, 95
juxtanucleare, exoerythrocytic schizogony, 447
in ducks
P.lophurae infection
naphthoquinone in treatment, (115)
suppression of, by quinine, 333.
chemotherapy of pre-erythrocytic stages, 106
control
by action of antimalaria drugs on mosquitoes, 909
Molinillo plant, 447
exflagellation of parasites and mosquito immunity, 335
*p*H values, 335
experimental quinoline studies, 711
sulphonamides in, (616)
immunology of pre-erythrocytic stages, 106
plasma biotin and infectivity, 446
prophylactics
endochin, 220, 703
rôle of body tissues in treatment, 1122

Malaria—*cont.*
avian—*cont.*
tissue culture of erythrocytic schizogony, 107
sex of host as factor, 220
splenectomy and suppressant activity of quinine, 1123
treatment
action of drugs in stimulating immunity, 1123
quinine enhanced by splenectomy, 1124
cinchona alkaloids, 446
cinchonidine and quinine, synergistic action, 447
opsonin-like action of drugs, 1123
rôle of reticulo-endothelial system, 1123
synergistic effect of chlorguanide and sulphadiazine, 119
behaviour of parasites in preserved blood, 799
benign tertian
among psychiatric patients in the Netherlands, 1108
complement fixation in, 1107
duration of infection, 1004
relapse
treatment
SN 7266, 1112
SN 8557, 1112
and Blackwater Fever, Pathological Processes in [MAEGRAITH] (book review), 180
blood transfusion and, 1002
bone marrow affections and, 519
inhibition in, 606
sludged, 12
Bromeliads and, in Trinidad, 320
cerebral symptoms associated with *P.vivax*, 433
treatment
rationale of, 1110
chemotherapy, 702 (*bis*)
and erythrocytic forms, 105
in children [ECKSTEIN] (book review), 881
chronic
bone marrow reaction to, 1106
gastric secretion in, 321
treatment by pentaquine, 706
cirrhosis of liver in, 433
congenital, 14, 434, 1108
control
in Amazonia, 331
the Army, 216
Bolivia, 218
Bombay, 16, 17
California, 500
Chile, 1008
China, 219
Cyprus, 807
Delhi, 17
Georgia, 440
Hungary, 896
Isle of Elba, 316
Italy, 217
Morocco, 1008, 1097
Peru, 1027
Sardinia, 117

Malaria—*cont.*
control—*cont.*
by action of antimalaria drugs in mosquitoes, 909
chloroquine, 524
coastal swamp drainage, 1117
combined dust and spray for malaria and typhus, 27
DDT, 109, 440, 524, 1008
barrier spray, 1118
oil-mist technique, 709
residual toxicity, 443
"water-soluble", 218
derris as larvicide, 219
Gammexane, 524
Gyron, 1008
irrigation and drainage, 1008
of *Kerteszia* in Brazil, 332
larvivorous fish, (1008)
"Malariol", 807
modern concepts in, 1114
paludrine, 524
Paris Green, 807
problems and progress in U.S.A., 1118
proguanil, 524
pyrethrum, 908
SN 7618, 524
delayed onset, suppressive drugs and, 15
diagnosis
clinical, (321)
complement fixation, 527
serological methods, 699
by splenic puncture, 700
teaching of, 518
ducks as mosquito predators, 116
duration of infection, 1004
effect of attacks, on psychiatric symptoms, 1109
encephalic syndrome in, 903
epidemic
Finland, 1945, 205
Kenya, 1940, 1104
Middelbourg, Netherlands, 314
control measures, 315
Oran, Algeria, 897
Rumania, 1946, 1115
control measures, 1115
epidemiology
in China, 602
Italy, during and after the War, 109
eradication
from Argentina, 332
U.S.A., proposals for, 440
erythrocytic schizogony, types of, 798
exoerythrocytic cycle, studies on, 8
exoerythrocytosis problems, 799
experimental
effect of paludrine on *P.malariae*, 325
P.vivax, 324
proguanil as prophylactic, 325
fifty years of war against, 1007
Filariasis and Yellow Fever in British Guiana [GIGLIOLI] (book review), 183
forecasting epidemics in India, 697
healthy carriers, 601
high altitudes and, 898

Malaria—*cont*
Hooker oxidation reaction, with naphthoquinone, (115)
immunity in childhood, possible forms of, 1113
imported, studies of, 322
incidence, forecast of, in the Punjab, 6
indigenous in post-war period, 426
induced
complement fixation in, 1107
serum protein in, (605)
treatment by metachloridine (SN 11,437), 1111
in infancy and childhood, possible effects of, 1113
inoculated
epidemic of, 896
serum reactions, time of appearance, 900
treatment
chloroquine intramuscularly, 905
pentaquine-quinine, 906
Institute of India report for 1947, 787
International Congress at Washington, 1093
jaundice in, (212)
latent period prolonged, 113
Malayan Union Advisory Board report, 524
malignant tertian, duration of infection, 1004
malnutrition and, 698
Mannich reaction with naphthoquinone, (115)
melano-flocculation in diagnosis, 903
value of, during treatment, 903
meningeal symptoms in, 902
meningitis in, 902 (*bis*)
in monkeys, 333
changes in blood pigments, 614
development of resistance to paludrine, 709
electrocardiogram in, 1121
exoerythrocytic stages in, 1009
fate of sporozoites of *P. cynomolgi* injected, 1122
hypersensitivity to malarial antigens, 526
Plasmodium cynomolgi life-cycle, 443
knowlesi metabolism, 117
prophylactic value of CAM-AQI, 787
treatment
paludrine, 219
mortality from, in Venezuela, 7
myeliod leukaemia and, 519
reaction in, 802
National Society, account of, 787
nephritis in, 519
outbreak in Agro Romano, 1944, 427
parasite-fever threshholds, 323
rate
in Amazonia, 31
Belgian Congo, 601
children, 897
Corsica, 315
Morocco, 1096
Portuguese Guinea, 1105
parasites
in blood, rapid stain for, 96
exoerythrocytic forms of, 103-109
in placental blood, 699
paroxysm as shock phenomenon, 215
treatment
anti-shock with CO_2 globulin, 215

Malaria—*cont.*
pathogenesis of, (605)
pernicious attacks in childhood, 1003
prognostic factors, 903
persistent infection in returned soldiers, 601
petechiae in, 903
plasmodia distribution in ethnic groups in Indo-China, 206
exoerythrocytic stages, 317
stain for, 413
Plasmodium vivax infection
development of immunity, 803
tolerance, 803
duration of, 605
pneumonia, 114
pregnancy and, 699
premunition among Cambodians doubtful, 513
among Moïs of Southern Indo-China, 206, 207
prophylaxis
mepacrine, 217
paludrine, 216, 325, 329, 602, 612, 705
recommendations for, 608
proguanil, 437, 706, 806
recmomendations for, 608
stream flushing, 217
provocative attacks of, 13
and immunity, 14
psychic disturbances in, [GUIJA M ORALES] (book review), 684
quartan, duration of infection, 1004
quinacrine, synthesis of analogues, (437)
rainfall and, 6
relapse, 13
in Batavia, 901
constitution and, (323)
after paludrine, 213, 705
inhibition by tetanus toxoid, 1112
P. falciparum, 13
P. malariae, 13
P. vivax, 13
treatment
chloroquine, 905
mepacrine, 905
treatment
atebrin, 901
paludrine, 701
quinine, 901
and pamaquin, 606, 701
plasmoquine, (114), 902
quinine substitutes, 701
weather and, 13
research in North Borneo, (909)
reticulo-endothelial system in, 320
rice cultivation and, in Venezuela, 211
simulating appendicitis, 1108
soil erosion and, 116
spleen rate
in Amazonia, 31
Burma, 210
Corsica, 315
India, 109
Portuguese Guinea, 1105
Punjab, 110
Tjiandjoer, Dutch East Indies, 110
Veracruz, Mexico, 898
rupture, spontaneous, 113

Malaria—*cont.*
splenic index
in El Salvador, 6
Mexico, 429
Middelbourg epidemic, 314
Szechuan, 428
Veracruz, Mexico, 898
subtertian
acute abdominal symptoms in, (434)
grey hepatization after, (434)
prognostic value of parasite counts in untreated cases, 1107
Summary of Recent Abstracts, 195-204, 301-314.
suppressants, 612
chlorguanide, 612
chloroquine, 612, 1006, 1116
diphosphate, 707
comparison of drugs, 1008
neo-premaline, 1116
paludrine, 612, 806, 907
pentaquine, 1116
quinacrine, 1005
SN 6771, 1007
sontochin, 1006
survey in Lower Bengal, 109
Macedonia and Thrace, 316
swamp cultivation and increase of, in Uganda, 9
synthetic antimalarials, (611)
therapeutic, 14
comparative susceptibility of patients, 321, 322
physiological studies in man, 801
preservation of plasmodium by freezing, 430
risk in Anopheline-infested areas, 427
treatment by paludrine, 703
transference by preserved blood, 1002
transmission, *Kerteszia* in Brazil, 332
treatment
acridine derivatives, (435)
advantages of high initial doses, 434
amidines, (706)
antimalarial drugs, summary of, 1109, 1110
field trials in Egypt, 435
studies, (806)
antimalarials antagonistic to adenosine, 522
atebrin, *see* mepacrine
benzimazoles, structure and antimalarial activity, (437)
CAM-AQI, *see* camoquine
camoquine, 435, 436, 610, 611, 702, 1110
chinoplasmine, 1109
side-effects, 1109
chloroquine, 214, 435 (*bis*), 436, 521, 610 (*bis*), 702, 805, 905, 1006, 1110
diphosphate, 707
isopentaquine, 702
"Kiniplex", 1109
mepacrine, 214, 436, 702, 904, 905, 1104, 1109
and pamaquin, 705, 1116
psychoses attributed to, 607
metachloridine, 214
metoquine, *see* mepacrine

Malaria—*cont.*
treatment—*cont.*
mode of action of antimalarial drugs, 1110.
modern antimalarial drugs compared, 1110
nivaquine B, *see* chloroquine
C, (3038 RP), *see* sontochin
oxychloroquine, 436, 610, 702
paludrine, *see* proguanil
"palusil", *see* proguanil
pamaquin, impairment of sympathetic reflexes by, 607
pentaquine, 214, 702
proguanil, 114, 213, 325, 435, 436, (520), 602, 608, 610, 702, 705, (806), 906
determination of, (806)
parenterally, 520
recommendations for, 608
protective action of SN 5241, 1111
quinacrine, *see* mepacrine
quinamine, (706)
quinine, (15), 520, 904, 1109
and pamaquin, 606
determination of degradation product in chick, 324
intravenous, 323
avoidance of fatalities, (607)
resochin, 702
SN 6771, 1007
SN 6911 *see* sontochin
SN 7618 *see* chloroquine
SN 8317 *see* oxychloroquine
SN 10, 751 *see* camoquin
SN 13, 274 *see* isopentaquine
SN 13, 276 *see* pentaquine
sontochin, 702, 1005, 1110
sulphadiazine, 214
danger with pentaquine, 215
sulphamethyldiazine, 521
synthetic antimalarials, (329), (522)
United States statistics for 1946, 603
vectors in Morocco, 1096
zoophily as cause of reduction, 696

Malaya
health of certain estates of, reports for 1946, 1947 and 1948, 987
preventive medicine in, 588
review of public work in, (524)
squirrels, key to, (589)

Mallophaga in Japan, studies on, (675)

Malnutrition *see also* Deficiency Diseases, kwashiorkor, etc. cirrhosis of liver and, 390
corneal opacities in, 389
cutaneous signs, 277
in India, 389
Malaya, 277, 278
Peru, infantile, 160
South Africa, malignant, 159
ocular signs, 277

Mandrillus leucophaeus, balantidiasis in, 262

Manger cephalin-cholesterol test in malnutrition, 160

Mansonella ozzardi
in Guadeloupe, (1068)
long incubation of infection, 1068
infection with tuberculosis, 1068

Mansonia
annulatus, vector of *F. malayi*, 67
indiana, vector of *F. malayi*, 67
longipalpis, vector of *F. malayi*, 67
perturbans, notes on, (94)

Mansonioides in Mauritius, 516
uniformis and filariasis in Ceylon, 487

Marmota flaviventris, plague in fleas of, 1144

Mecca pilgrimage, sanitary control, evolution of, 418

Medical Parasitology [PESSÔA] (book review), 595

Medical Services in the Belgian Congo, Development of, [SCHWETZ] (book review), 593

Medicine, tropical, International Congress, 1093
western, development of, in India, 879

Mediterranean anaemia *see* Cooley's anaemia

Melanin and its precursors, (12)

Melanodermia as protection against trachoma, 1082

Melarsen, action in trypanosomiasis, 919

Mel B, action in trypanosomiasis, 919

Melioidosis
in Cochin-China, 971
an Indian, 498
afebrile, 498
chronic, in U.S.A., 90
clinical features, 971
experimental, treatment by aureomycin, 1085
pathology, 871

Meningo-encephalitis in West-African troops, 971

Mepacrine, conversion into thioacridones by hydrogen sulphide, (15)

Meriones persicus, natural infection by *S. microti*, 1048

Mestor (*Panstrongylus*) *rufotuberculatus*, infection by *T. cruzi*, 1017

Metachloridine (SN 11, 437) in treatment of induced malaria, 1111

Metagonimus yokogawi in dogs in Szechuan, 376

Metoquine in treatment of malaria, 436

Miaquine in malaria, 611

Mice as suitable animals for experimental *Schistosomiasis mansoni*, 948

Micrococcus (*Coccobacillus*) *mycetoides* the cause of tropicaloid ulcer, 398

Microfilaria, forms of, in French Guiana, (1068)

Microfilaria malayi in Borneo, 67

Microfilariae, technique for enumeration of, in blood, 67

Micro-organisms, type-cultures in Commonwealth, 981

Microsporum
audouini infection, treatment, 496
canis infection, treatment, 496

Microtrema truncatum in Szechuan dogs, 376

Mimosa asperata, G. tachinoides and, 227

Miracil in helminthiasis, (59)
D in schistosomiasis, 380
haematobium, 947
japonicum, 481
mansoni, 481

MISCELLANEOUS DISEASES, 88-91, 169-170, 286, 399-401, 498-499, 572-578, 783-785, 871-874, 970-972, 1084-1087, 1182-1184

Miscellaneous diseases
incidence among children in Kweichow, (499)

Mitsuda test *see* Lepromin test

Molinillo plant *see Leonitis nepetaefolia*

Molluscicides
benzene hexachloride, 1057
copper sulphate and BHC compared, 1057

Molluscs
of medical importance in Cuba, 1058
and veterinary interest, catalogue of, 981
plants toxic to, 266

Monkey
Howler, normal host of Raillietina, 951
yellow fever and, 932

" Mosaic skin " in East Africans, 158

Mosquitoes (see also under Genera, e.g. *Aëdes, Anopheles,* etc.)
in Aruba (Caribbean), 675
Bonaire, 675
Burma valleys, 210
Bwamba County, Uganda, (137)
Canada, (1088)
East Africa, 172
French St. Martin, 876
Manitoba, 580
Mauritius, survey, 516
Netherlands Antilles, 876
Windward Islands, 408
Queensland, (581)
Ruanda-Urundi, 876
Socotra, 10
Uganda, experimental catches on anaesthetized monkeys, 458
Veracruz, Mexico, 899
action of antimalarial drugs on infected, 609
breeding in plant axils, 172
places on the outskirts of Paris, 974
Bromelia pinguin and breeding in Haiti, (112)
control
in Belgian Congo, 329
Britain, 500
California, conference report, 290
Canada, (1088)
by aircraft, 290
comparative toxicity of chlorinated compounds, 500

Mosquitoes—*cont.*
control—*cont.*
DDT, 807
as barrier spray, 709
smoke generators, 330
water v. oil suspension, 331
of diseases transmitted by, 355, (501)
Gammexane, 329, 807
prehatching treatment, 1088 (*bis*)
street sewers, 974
Todd Insecticidal Fog Applicator, 291
Culicine, Chinese, 581
elimination from North-East Mexico, 429
eradication, need for studying their varying biology, 1119
feeding,
delayed papular reaction, 514
habits, precipitation test, 93
immediate weal reaction, 514
mechanism of, 514
flight range of Culex, 173
larvae
action of supersonic waves on, 976
tracheal gills in, (1088)
larvicides
cork powder and DDT, 908
" Gyron ", 523
nutrition of larvae, (408)
permeability of clothing to bites. 522
Philippine, synopsis of, 581
" pool feeding ", 514
radiophosphorus in, for estimating length of life and range of flight, 1186
radiostrontium in, for estimating length of life and range of flight, 1186
reactions to aircraft environment, 171
repellents applied to clothing, effectiveness of, 1167
spread from loss of animal barriers in Manila City, 518

Mossy foot in Africa, 1078

MSb action in trypanosomiasis, 919

Mulago Hospital, pathological studies at (90), 575, 873

Multiceps
multiceps coenurus infection in man, 561
serialis, human infection in France, 950

Murine typhus *see* Endemic typhus

Mus musculus in Rangoon, 256
natural infection by *S. microti,* 1048

Musca domestica, action of DDT on larvae and pupae, 291
and transmission of *E. histolytica,* 937

Mycetoma pedis, 494
radiology of, 778

Mycobacterium leprae
appearances under the electron microscope, 476
cultivation of, 1050
symbiosis and, 264
Faraco's method of staining in sections, 1149
morphology compared with other acid-fast organisms, 476
and physiology, 368
Spanish strain of, 46
staining methods, 842

Mycoses in Ecuador children, 573
fluorescent staining by primulin, 571
Myiasis
in French Guiana, (582)
Indo-China, 286
Panama, cutaneous, 91
Spain, 93
intestinal, in Chile, 1087
ocular, 93
in Gibraltar, 1178
Mylol cream as insect repellent, 564
Myriophyllum japonicum and cultivation of *P. boissyi*, 946
P. truncatus, 946
Naga sore, aetiology, 86
Naphthoquinone in malaria, (115)
Native Authority Dispensary System in Tanganyika, 99
Nebo hierochonticus, stinging by, in Palestine, 867
Necator americanus infection in Venezuela, 273
Nectandra pichury see also carobinase
Nematodes
parasitic
metabolism in infection by, (486)
tissue changes caused by, (486)
Neocidol, emulsion and powder, effect on scorpions, 493
Neophlebotomus shannoni in Florida, (876)
Neo-Premaline
constitution of, 1117
as malaria suppressant, 1116, 1117
Neoschoengastia nuñezi as cause of dermatitis in Mexico, 394
Nesokia indica, natural infection by *S. microti*, 1048
Neurasthenia
tropical, 783
environmental causes, 784
Nilodin *see* Miracil D
Nippostrongylus muris for testing anthelmintics, 751
Noma among African natives, 498
in Northern Rhodesia, 498
Nomenclature of Disease [Royal College of Physicians of London] (book review), 190
Nosopsyllus fasciatus on rats in Mexico, 819
reduction by dusting with DDT, 247
Nutrition
and adaptation to tropical climate, 963
food and, in Venezuela, (389)
in French Colonies, (1166)
nutritive value of legumes, 399
plasma-protein levels in West Africans, 962
survey in African railway workers, 389
Nutritional
liver disease
chemistry of, 860
clinical manifestations, 860
treatment, 860
survey, Jullundur, 767
Nyasaland Protectorate, report on water resources, 676
Octodon degus, natural host of *T. cruzi*, 449
Oesophagostomum apiostomum in an Indonesian, 955
Oestrus ovis cause of ocular myiasis, 93
Oktachlor in control of Triatomidae, 449
Onchocerca volvulus
allergy, 386
diagnosis
skin biopsy, 854
experimental infection of *Simulium manga beirai*, 764
pathogeny of lesions produced by, 385
vectors in Anglo-Egyptian Sudan, 405
Onchocerciasis
in Anglo-Egyptian Sudan, 957
Guatemala, 855
Kenya Colony, 854
Mexico, 564
biology of *Simulium* larvae, 70
control, 565, (1068)
diagnosis, 565
Hetrazan allergy, 656
treatment
Hetrazan, 565, 855, 958 (*bis*), 1065
stibophen, 1162
Oncomelania in Szechuan, 429
anhuinensis, host of *S. japonicum*, 559
costulata, host of *S. japonicum*, 559
crassa, host of *S. japonicum*, 559
elongata, host of *S. japonicum*, 559
hupensis, host of *S. japonicum*, 559
maintenance of, in laboratory, 1158
longiscata, host of *S. japonicum*, 599
moellendorfii, host of *S. japonicum*, 559
multicosta, host of *S. japonicum*, 559
nosophora, naturally infected with *S. japonicum* in Japan, 482
quadrasi infection by schistosomes, 152
schmaekeri, host of *S. japonicum*, 559
yaoi, host of *S. japonicum*, 559
Onyalai
in East Africa, 873
ascorbic acid deficiency in, 860
distribution in Africa, 573
secondary thrombocytopenia resembling, 873
symptoms, 573
treatment, 496
Planavit, 873

OPHTHALMOLOGY, TROPICAL, 667-671, 1081-1083, 1176
conjunctivitis, epidemic
in Venezuela, 1082
possible vectors, 1082
solar burns of fundi, 1081
trachoma, treatment by aureomycin, 1082

Oriental sore *see under* **LEISHMANIASIS**, cutaneous

Ornithobilharzia sp., infection of cattle in Szechuan, 647

Ornithodorus sp.
transmitter of *Sp. naganophila*, 43

Ornithodorus
canestrinii
experimental transmitter of *S. microti*, 1049
transmitting *S. microti*, 44
coniceps
in France, 410
human infection from pigeons, 410
erraticus
in Iran, 43
South Morocco, 43
transmitter of *Sp. crocidurae*, 43
Sp. merionesi, 43, 836
vector of relapsing fever spirochaetes in W. Africa, 1046
lahorensis
in Anatolia, 352
experimental transmitter of *S. microti*, 1049
transmitting *S. microti*, 44
moubata
intracoelomic inoculation with Rickettsiae, 624
toxicity of neoarsphenamine, effect of BAL on, 675
normandi
in South Tunisia, 43
transmitter of *Sp. normandi*, 43
tartakowsky
in Usbekistan, 44
transmitting *S. latyschevi*, 44
tholozani and transmission of *S. microti*, 1049
tolidor, SNP as insecticide, 1131

Oroya fever *see* Bartonellosis

Oscinis pallipes, distribution and name of, (876)

Otitis caused by *Enterobius vermicularis*, 765

Otobius megnini
in California, 252
vector of Q fever virus, 252
Ovalocytosis and the sickle cell trait, 1075

Oxychloroquine, tolerance of, 904

"Painful feet" in deficiency disease, 72

Palm-leaf traps for snails in Egypt, 646

Paludrine *see also* proguanil
activation of, by rat liver, 335
benziminazole analogues of, (114)
cerebral malaria, reasons for failure in, 1110
inhibitory action on gastric secretion, 325 (*ter*)
mode of action, 335
pharmacology of, 327

Pan-American Sanitary Bureau activities in Central America, 441

Pandanus, mosquito breeding and, 172

Panstrongylus
diasi in Brazil, 125
geniculatus in Brazil, 125
megistus in Brazil, 125
natural infection by *T. cruzi* in Brazil, 125
vector of *T. cruzi* in Minas Gerais, 620

Papio sphinx, Watsonius watsoni in, 482

Para-aminobenzoic acid in experimental typhus, 246

Paracoccidioidal granuloma *se also* Blastomycosis
in Brazil, 284

Paracoccidioides brasiliensis
ano-rectal localization, 84
cerebral tumour caused by, 1081
fluorescent staining, 571
infection, (167)
of anus, 283
mouth, 283
vaccine for Blastomycosis, 168

Paragonimiasis
pulmonary in Philippines, 649
X-ray appearances, 1055
treatment
emetine hydrochloride, 649
experimental in dogs, pathological changes, (950)
tartar emetic, 649

Paragonimus spp.
in dogs in Szechuan, 376
infection in Philippines, 152

Paramoecium caudatum for testing antivenin titres, 568

Paramphistomum cervi, concentration of ova by continuous sedimentation, 950

Paraplegia from intraspinal coenurus, 65

Parasites
in blood of birds in S. Carolina, 616
mammals in Rome Zoological Gardens, 179
rodents in Asmara, 1161
intestinal
in Addis Ababa, 1032
Colombia, 1055
Gabon estuary, 844
Guayaquil hospital patients, (376)
school-children, (376)
Portuguese Guinea, 844
detection
AEX method, 53, 642
Faust's method, 643
Stoll's method, 643
Willis-Mallory method, 643

Parasitological
studies in Venezuela, 505
survey of African school-children in Nairobi, 432

Parasitology, Bacteriology, Haematology and, [STITT] (book review), 185
reflections on, 987
Manual of Medical, with Technique for Laboratory Diagnosis [ZELIFF] (book review), 194

Parasitosis
in Malaya, 844
Parathion, larvicide for *Aëdes aegypti*, 412
Pasteur Institute
Coonoor, report for 1947-48, 588
French West Africa, report for 1946, 416
1947, 1095
Martinique, report for 1946, 98
Shanghai, report for 1948, 787
Pasteurella pestis
behaviour in glycerin mediums, 1143
catalase activity as test for virulence, 825
change of phage after transfer on *P. pseudotuberculosis* and *Shigellae*, 460
cultivation from single cell of avirulent strain, 736
cytological response to bacteriophage, 1029
long survival of culture, 630
murder by injection of, 33
not affected by sodium fluoracetate poison of rats, 737
relation of catalase to activity, 825
survival in dead fleas, 461
Pathology of Central African Natives, (90)
Bb 852 in treatment of murine hyphus, 540
Pediculus humanus transmitting *S. microti*, 44
Pellagra
in Brazil, 163
Egypt, 389
India, 73
Rumania, 162
decrease in Cincinnati, 1072
electrocardiogram in, 164
electrocardiographic changes, 74
"hairy tongue" and, 164
infantile, 159
in India, 163
menstrual disorders in, 565
multiple vitamin deficiencies with, 1073
treatment
pyridoxine, 389
tryptophane, 658
Penicillin
action on cultures of *E. histolytica*, 549
in rickettsial infection, 246
Pentamidine pharmacology of, 916
isethionate in kala azar, 925
Pentaquine-quinine in malaria, ill-effects of, 906
Pentastomiasis of lungs, X-ray appearances, 1055
Petrol compressor for insecticidal spraying, 1120
Pfeifferella whitmori
inhibition by aureomycin, 1085
chloromycetin, 499
insensitivity to penicillin, 499
possible variant of *Ps. pyocyanea*, 972
sensitivity to sulphonamides, 499
Phenanthridinium in bovine trypanosomiasis, (19)
Phenothiazine for enterobiasis, 656, 961, 1166
p-phenylene diguanidine
action in *T. equiperdum* infection, 1128
ineffectual in *L. donovani* infections, 1128
experimental *Litomosoides carinii* infection, 1128
P. lophurae infection, 1128
Schistosomiasis mansoni, 1128
Trypanosomiasis cruzi, 1128
Phlebitis
tropical, in Rhodesia, 574
relation to gangrene of extremities, 575
symptoms, 574, 575
treatment by planocaine injection, 575
Phlebotomus spp.
in Ceylon, North, 974
Colombia, 622
Ethiopia, 1088
distribution, 1088
taxonomy of, (582)
French Guiana, (582)
Oran Sahara, biology of, (499)
U.S.S.R., 535
Venezuela, (582)
in burrows of *Rhombomys opimus*, 536
Spermophilopsis leptodactylus, 536
experimental rearing of, 94
microclimate of burrows and, 536
mounting of, 582
new species in S. Serbia, (675)
rodent burrows in Oran and, (499)
africanus in French Sudan, 816
antennatus in North Ceylon, 975
argentipes
in North Ceylon, 975
South America, 127
ariasi in Portugal, 94
ayrozai
in French Guiana, (582)
South America, 127
babu in North Ceylon, 975
cayennensis in Venezuela, (94)
clydei in French Sudan, 816
colombianus, vector of leishmaniasis in Colombia, 623
evansi, vector of leishmaniasis in Colombia, 623
fischeri in South America, 127
flochi in French Guiana, (94)
intermedius in South America, 127
larroussei, synonym of *P. mascittii*, 1088
longipalpis, vector of leishmaniasis in Colombia, 623
minutus
in French Sudan, 816
Portugal, 94
monticolus var *incarum*, vector of leishmaniasis in Colombia, 623
noguchii in South America, 127
osornoi, vector of leishmaniasis in Colombia, 623
panamensis, vector of leishmaniasis in Colombia, 623
papatasii, lowered infectivity for old strains of Leishmania, 450
paraensis in French Guiana, (582)

Phlebotomus spp.—*cont.*
perfiliewi
biology of, 1134
control by DDT, 1134
vector of leishmaniasis on Adriatic Coast, 1134
perniciosus
experimental rearing of, 94
in Portugal, 94
roubaudi
in French Sudan, 816
var. *fourtoni*, (94)
papatisi in French Sudan, 816
sergenti
in Portugal, 94
shannoni
in Florida, (876)
squamiventris, vector of leishmaniasis in Colombia, 623
verrucarum
control by DDT, 1027
Phormia regina and transmission of *E. histolytica*, 937
response to tarsal stimulation, 404
Phyllostoma superciliatum and paralytic rabies in Trinidad, 254
Physa
acuta
control by BHC and copper sulphate compared, 1057
cubensis
vector of *F. hepatica*, 1058
on watercress, causing outbreak of fascioliasis in Cuba, 271
Physopsis africana
experimental work with schistosomes, 150
Pig-tail monkey *see Macaca nemestrina*
Pila conica, second intermediate host of echinostome in Java, 63
Pilgrimage, Mecca,
cholera and, 418
evolution of sanitary control, 418
Pinta *see also Treponema carateum*
in Amazonia, Brazil, 777
Ecuador, 166, 573
U.S.A., returned soldiers, 777
control, 869
diagnosis
differential, 395
from leprosy, 369
dyschromic lesions of, 777
endemic zones, in tropical America, 166
epidemiology of, 777
inoculability of syphilitics with, 1171
Mexican and Cuban, 494
the same or different diseases, 395
modes of transmission, 869
and other treponematoses compared, 1170
prophylaxis, 869
Pintogenic zones in tropical America, 166
Pinworm see *Enterobius*
Pituitary gland in adult male African, observations on, (784)

PLAGUE, 31-36, 141-143, 255-257, 357-358, 460-462, 545-546, 630-631, 736-738, 824-825, 934-935, 1029, 1143-1144
in Calcutta, 33 (*bis*), 34, 35, 934
Canada, 143
China, 256
Cochin-China, 357
Corsica, 736
Ecuador, 573
Gaya, 934
Madagascar, 357
New Mexico wild rodents, 1144
South Africa, 31
Venezuela, 255
bubonic
oedema of legs in, (461)
treatment, 141
Haffkine serum, 141
streptomycin, 142
sulphadiazine, 142
sulphathiazole, 142
control, 935
in Belgian Congo, 737
Calcutta outbreak, 35
California, 500
China, 257
Corsica, vaccination, 736
sulphadiazine, 257
survey of methods, (737)
vaccine, formol killed, 257
Girard-Robic living avirulent, 737
single dose vaccination, 35
diagnosis
in rats poisoned by sodium fluoracetate, 737
"Domestic flea index", importance in assessing risk of epidemic, 357
epidemiology, vegetation-soil map in relation to, 100
gerbils as primary reservoir, 31
human, history of, in South Africa, 31
of sylvatic origin, 31
importation into China from Burma, 257
Mastomys coucha as secondary reservoir, 31
pneumonic in India, 934
treatment
antiserum, 358
streptomycin, 256, 358
sulphamerazine, 358
present outlook, 935
prevention, (826)
prophylaxis
sulphathiazole, 257
sulphonamides, 935
vaccines, 935
rat-control in Rangoon, 256
destruction by DDT, 728
flea index in Calcutta outbreak, 34
pest problem in Queensland, (461)
Rattus as tertiary reservoir, 31
rodent hosts
Citellus richardsoni in Canada, 143
spread from wild to domestic rodents in California, 630
Summary of Recent Abstracts, 597-601

Plague—*cont.*
suspected cases, investigation of, in Campbell Hospital, Calcutta, 34
sylvatic in South Africa, 31
transmission
bionomics of fleas in relation to, 34
rats in relation to, 34
Pediculus humanus in Madagascar, 357
Xenopsylla cheopis
food and moisture in ecology of, 32
survival on young and adult mice, 31
treatment
new drugs, (826)
serum, 934
streptomycin, 35, 545, 934
sulphadiazine, 35
sulphamethazine, 35
sulphonamide drugs, 35, 934
vaccines
Haffkine Institute's, assessment of, 35
Xenopsylla cheopis, experiments with mice, 31

Planorbidae, new classification of, 1156

Planorbis
adowensis see also P. pfeifferi
vector of *S. mansoni* in Belgian Congo, 1157
boissyi
ecological requirements, 946
methods of packing for transport, 946
choanomphalus
characteristics of, 1157
vector of *S. mansoni* in Belgian Congo, 1157
corneus, effect of copper salts on, 266
dufourii
control
BHC and copper sulphate compared, 1057
vector of *S. haematobium* in Portugal, 1056
guadeloupensis see Australorbis glabratus
pfeifferi, characteristics of, 1157
stanleyi, characteristics of, 1157
vector of *S. mansoni* in Belgian Congo, 1157
tanganyicensis
characteristics of, 1157
vector of *S. mansoni* in Belgian Congo, 1157

Plant axils, mosquitoes and other inhabitants, 173

Plasmodia spp.
exoerythrocytic forms, search for, 429
stages of, 317
human
development in mosquito, 429
infection rates in mosquito, 430
parasitological study of the genus, (797)
relationship to *Haemoproteus*, 799
Leucocytozoon, 799

Plasmodium
cathemerium
exoerythrocytic phase, 798
life-cycle in the canary, 1126
"3M" strain transmitted to the duck, 120
infection
treatment
endochin, 220
circumflexum
in S. Carolina birds, 616
cynomolgi
development of resistance to paludrine, 709
effect of paludrine on, 219
exoerythrocytic phase, 798
stages in *Macaca mulatta*, 1009
fate of sporozoites injected into monkeys, 1122
life-cycle, 443
pre-erythrocytic stages, 104
elongatum
development of, 798
in S. Carolina birds, 616
falciparum
action of atebrin on, 700
nivaquine C on, 521
plasmoquine on, 700
quinine on, 700
apparent antagonism of *Cl. welchii*, 804
effect of drugs on mosquitoes infected with, 609
SN 7618 on, 435
exoerythrocytic forms of, 797
in malarial meningitis, 902
in placental blood, 699
indigenous infection in France, 695
paludrine-resistant strains, 1110
parasite count in prognosis, 1107
physiological studies in induced infection, 801
proguanil as prophylactic in experimental infection, 325
prophylaxis
proguanil, failure of, 706
schizogony in the skin of African children, 7
sensitivity of New Guinea strains to paludrine, 1111
survival in preserved blood, 799
viability in preserved blood, 1003
infection
in Belgian Congo, 214, 601
children, 897
Calcutta, 325
Central Africans, 428
Cochin-China, 328
Eritrea, 213
France, 112
Indo-China, 206, 207
Kenya highlands, 898
Nairobi children, 432
Oran epidemic, 897
Paris, 112
Portuguese Guinea, 1105
Sardinia, 117
Spain, 427
Szechuan, 428
congenital, 1108

Plasmodium—cont.
falciparum—cont.
infection—*cont.*
inhibition of relapses by tetanus toxoid, 1112
in hospital patients in Nairobi. 1104
simulating appendicitis, 1108
suppressant action of paludrine, 806
treatment
CAM—AQI, 436, 611
nivaquine and paludrine compared, 705
paludrine, 705
" Palusil ", 436

gallinaceum
acquired resistance to antimalarials, 446, 910
adrenal hypertrophy in infection by, 809
course of infection in embryo ducks, 808
effect of cinchona alkaloids on, 447
dichroine on, 615
humidity on oöcysts, 710
temperature on oöcycts, 710
tissue extracts on, 909
sex of host, 220
erythrocytic forms and changes in life-cycle, 108
exoerythrocytic forms, infectivity of, 445
phase, 798
glucose consumption in culture, 1011
metabolism, effect of quinine on, 445
mode of action of drugs on, 1123
pre-erythrocytic development in chick embryos, 809
resistance to paludrine, 118
sulphadiazine, 119
staining of, 95
synergistic action of chlorguanide and sulphadiazine against, 119
infection treatment by endochin, 220

hexamerium in S. Carolina birds, 616

juxtanucleare, exoerythrocytic forms in the fowl, 447

knowlesi
action of CAM—AQI, 787
chloroquin, 787
antigens for testing hypersensitivity in monkeys, 526
blackwater fever and, in monkeys, 810
blood pigment changes caused by, 614
metabolism of, 117

Plasmodium knowlesi infection
effect of blood and oxygen on experimental, 333
electrocardiographic changes in, 1121
treatment by endochin, 221

lophurae
acquired resistance to drugs, 446
effect of blood and oxygen on experimental infection, 333
dichroine on, 615
infection of inoculated mammalian erythrocytes in chicks, 912
latency of infection in chickens, 808

Plasmodium—cont.
lophurae—cont.
relation of infectivity of ducks to biotin content of plasma, 446
treatment by naphthoquinone, (115)

malariae
in placental blood, 699
life-history, experimental study, 431
susceptibility of chimpanzee to human parasite, 443
infection
in Belgian Congo, 214
children, 897
Cape Verde Islands, 208
Central Africans, 428
Indo-China, 206, 207
Kenya highlands, 898
Kigezi, Uganda, 10
Nairobi, children, 432
Spain, 427
Szechuan, 428
infection
treatment
quinacrine, 904
quinine, 904

oti in S. Carolina birds, 616

ovale
in placental blood, 699
infection
in Beirut, Lebanon, 1109
Eritrea, (696)
treatment
quinine and mepacrine, 1109

relictum
effect of cinchona alkaloids on, 447
persistence in culture, 18
infection
in Algerian sparrows, 448
S. Carolina birds, 616
effect of dichroine on, 615
treatment by endochin, 220

vassali
exoerythrocytic development of, 808
acquired resistance to paludrine, 609
action of atebrin on, 700
nivaquine C on, 521
plasmoquine on, 700
quinine on, 700
blood-transmission and elimination of gametocyte production, 317
chief cause of malaria endemic in China, 603
exoerythrocytic forms of, 797
negroes more resistant than whites to infection, 322
pernicious attacks of, 897
physiological studies in induced infection, 801
placental blood and, 699
predilection for reticulocytes, 899
pre-erythrocytic stages of, 104
pneumonia, 114
survival in preserved blood, 799
tolerance not strain-specific, 803
viability in preserved blood, 1003

Plasmodium—cont.
vivax infection
in Calcutta, 325
Cape Verde Islands, 208
Central Africans, 428
Cochin-China, 328
Eritrea, 213
France, 112, 695, 1103
Indo-China, 206, 207
Isle of Elba, 316
Kenya highlands, 898
Nairobi children, 432
North-east Mexico, 429
Paris, 112
Poland, 1000
Sardinia, 117
Spain, 427
Sweden, 205
Szechuan, 428
complement fixation in, 1107
congenital, 1108
effect of SN 7618 on, 435
induced
treatment by metachloridine, 1111
inhibition of relapses by tetanus toxoid, 1112
relapses, periodicity of, 701
simulating appendicitis, 1108
suppression of attacks by paludrine, 612
treatment
CAM-AQI, 436, 611
chloroquine intramuscularly, in inoculated, 905
nivaquine and paludrine compared, 705
"Palusil", 436
pamaquin naphthoate, 1112
quinine-pamaquin, 701
Platynosomum fastuosum, biology and life-history, (154)
Polyhypovitaminosis *see* Deficiency disease
Polyplax spinulosa
on rats in Mexico, 819
City, 499
reduction by dusting with DDT, 247, 347
Population, African survey in Southern Rhodesia, (418)
Porocephaliasis of lungs, X-ray appearances, 1055
Prairie gopher *see Citellus richardsoni*
Pregnancy, agglutination of *Proteus OX*19, 129
Premunition, antimalarial, among the Moïs of Indo-China, 206, 207
Prionurus
australis
in North Africa, 280, 868
effect of DDT on, 493
stings by, treatment by antivenin, 280, 868
bicolor, stinging by, in Palestine, 867
crassicauda, stinging by, in Palestine, 867
Proguanil *see also* paludrine, *and under* Malaria, treatment
effective and toxic dosage, 327
Propamidine, pharmacology of, 916
*Proteus OX*19 agglutination as test for pregnancy, 538
Protozoa
incidence in man and dogs in Fort Chipewyan, Alberta 677
intestinal
in mice, carbarsone in, 469
Szechuan, (466)
iron-haematoxylin stain for, 502
of medical and veterinary interest, catalogue of, 981
quercitrin stain for, 1090
Protozoal infections
in epidemic in Japan, 547
research in chemotherapy, 286
Protozoological survey in Kenya, 641
PROTOZOOLOGY, GENERAL, 92, 170-171, 286-287, 401-403, 874-875, 972-973, 1184-1186.
Psammolestes coreodes in Brazil, 125
Pseudoamphistoma, new species in Ethiopia, 63
Pseudoboa cloelia, enemy of poisonous snakes in the Argentine, 968
Psoriasis
in Calcutta, 570
diagnosis from leprosy, 369
Psorophora confinnis in Caribbean Islands, 675
Psychodidae
Phlebotomus
noguchi, 407
peruensis, 407
verrucarum, 407
Warileya
phlebotomanica, 407
Pteroyldiglutamic acid *see* Diopterin
Pteroylglutamic acid *see* folic acid synthetic (PGA) synthetic in pernicious anaemia, 165
therapeutic indications, 79
Pteroylhaptaglutamic acid (PHGA), 79
Pteroyltriglutamic acid *see* Teropterin
Ptinus tectus in man, 1089
Public Health, Australian aborigines in relation to, 1098
Belgian Congo report for 1947, 415
Iraq report, 417
services in Morocco in 1947, 1097
Pulex irritans
on rats in Mexico, 819
in Saigon, 357
transmitter of plague in Ecuador, 573
Purú-purú *see* Pinta
Pyridoxine *see* Vitamin B_6
Quercitrin stain for protozoa, 1090
Quillaja as molluscicide, 266
Quinacrine, dermatitis due to, 607
psychoses due to, 607
tolerance of, 904

Quinine, estimation of excretory, 520
injection, risk of tetanus, 212
tetanus after injection, (520)

Rabbits as reservoir hosts of *F. hepatica* in Texas, 62

RABIES, 139-142, 253-255, 356-357, 459-460, 543-545, 728-736, 824-825, 933, 1028-1029, 1139-1143.
in Corsica, 728
Ecuador, 573
Mexico, 1139
Turkey, 139
Uruguay, 140
bat
in Mexico, 254
Trinidad, 254
in a calf, 139
canine, (357)
in a cow, 255
foxes, 1028
man from rat-bite, 731
complement fixation, time of development, 1029
control
in Corsica, 728
Uruguay, 140
Bolivar virus, 824
Maturin virus, 824
diagnosis
from filariasis in dogs, 139
stain for Negri bodies, 139
domestic animals, from foxes in Corsica, 728
epizootic in Alaska, 1028
experimental studies, (1140)
infection *vid* mucous membranes, 139
without a bite, 139
Negri bodies, new staining method for, 1141
neuro-paralytic accidents
pathology of, 1142
prevention by addition of serum, 735
paralytic
in Trinidad, fruit-eating bats and, 254
Venezuelan cattle, 824
control in Venezuela, 824
report of Pasteur Institute, Paris, 736
treatment
benzene-ether extracted vaccine, 732
effect of menstruation, 731
ovarian function, 731
failure of, 356
neuro-paralytic accidents after, 1142
prevention of, 733
report of Pasteur Institute for 1947, (140)
surgical, 732
vaccine, benzene-inactivated, 733
vaccination, absence of infection among vaccinated dogs, 141
effectiveness of, 544
encephalitis after, 543
failure of, 544
vaccine
allergy, 933
antibody response to, 1028
Coonoor, 588
effects of phenol and formol compared, 140
water-in-oil emulsion, immune response to, 140

Rabies—*cont.*
virus
antibiotic action of *B. mesentericus*, 1141
carriers, 729
chick embryo culture characteristics, 1140
pathogenicity, 1140
infection, 1140
cultivation of, 1028
in blood of developing chick embryo, 253
invasiveness of strains, 460
spreading effect of saliva, 729
factor due to hyaluronidase, 729
varying antigenicity of strains, 460
virulence anhanced by hyaluronidase of dog's saliva, 1141
virus fixe,
propagation in brain of guineapig foetus, 140

Raillietina
alouattae
in *Alouatta maconnelli* in Surinam, 951
demerariensis
in *Alouatta seneculus* in Surinam, 951
equatoriensis, 272
infection in Ecuador, 272
symptoms, 272

Rana
guntheri, sparganosis and, 64
limnocharis
intermediate host of *Diphyllobothrium mansoni*, 560
sparganosis in, 64
tigrina
intermediate host of *Diphyllobothrium mansoni*, 560
sparganosis in, 64

Randia as molluscicide, 266

Rat(s)
absence from Alberta Province, Canada, 142
census of, in Baltimore, 825
control
rodenticides, (501) (*bis*)
ANTU, 461
arsenic trioxide, 461
barium carbonate, 462
sodium fluoracetate, 461
strychnine sulphate, 462
thallium sulphate, 461
zinc phosphide, 461
ectoparasites
control by DDT, (256)
indices, (256)
in Mexico City, 499
Poland ports, 1144
in Texas, 818
Malayan, identification, 245
poison
ANTU, 358
DDT, 929
red squill, 358
"1080" 358

Rattus
exulans, in Rangoon, 256

Rattus—cont.
norvegicus
ANTU as poison for, 358
census in Baltimore, 825
in Rangoon, 256
study of feeding habits, 141
rattus
ANTU as poison for, 358
ectoparasites of, in Rangoon, 256
in Texas, Lowaca Co., 818
var. *argentiventer*, carrying infected mites in Malaya, 1136
brevicaudatus, reservoir host of echinostome in Java, 63

Reconox in treatment of *Enterobius vermicularis* infection, 1166

Red Fever of the Conogo, relation to infectious mononucleosis, 459

Reduviidae, American, systematic index of, 877

RELAPSING FEVER and other Spirochaetoses, 42-45, 262, 367, 470-472, 835-838, 1045-1049
in Bucharest, 838
China, 471
Colombia, 367
Cyprus, 470
Dakar, 1046
Iran, 43
North Africa, 42
Palestine, 835
Palestinian Arabs, 1045
Rumania, 45
activation of latent kala azar by, (15) 22
control
in California, 500
convalescent serum, lytic properties of, 837
epidemic in North Africa, 838
erythrocyte sedimentation rate in, 45
reservoir hosts in West Africa, 1046
rodents as reservoirs in Iran, 43
spirochaetes, research on, 1046
strain R XXIII in pyretotherapy, 836
tick-borne
in Dakar, 1047
Senegal, 1047
transmission
Ornithodorus erraticus in Iran, 43
tholozani, 43, 470, 471
treatment
arsenicals, 1046
convalescent serum, 837
neoarsphenamine, 472
penicillin, 1046
phenarsine hydrochloride, 472

Renal disease in African natives, 873

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS, 96-100, 178-180, 413-418, 502-505, 585-589, 676-677, 785-788, 879-880, 977-988, 1090-1098, 1188-1191.
Fiji Central Medical School, Suva, 178
Liverpool School of Tropical Medicine, 178
Wellcome Research Institution, 178

Research
Colonial, 1947-48, 96
1948-49, 977
medical, in Colonies, 1930-1947, 1090
scientific, New Belgian Institute, 585

Reticulitermes
hesperus
laboratory culture of, 975
lucifugus
laboratory culture of, 975

Retrofection, meaning of term, 960

Rhinoscleroma *see* Scleroma

Rhinosporidiosis
in Argentine, 284
Brazil, 284
Paraguay, 284
Uruguay, 284
Venezuela, 284

Rhinoestrus purpureus, cause of ocular myiasis, 93

Rhinosporidium seeberi infection in Venezuela, 284

Rhipicephalus
sanguineus
in Mexico, 351
effect of Gammexane on, 351
vector of Rocky Mountain spotted fever, 351

Rhodesia
Northern
report on water resources, 676
vegetation-soil map, 100

Rhodnius prolixus, rearing of, 242

Rice cultivation and malaria in Venezuela, 211

Rickettsia, see also under Typhus
akari, experimental infection, chloromycetin in, 1025
burneti
in Anatolia, 352
California, 352
effect of pasteurization on, 823
experimental infection, chloromycetin in, 1025
isolated in Israel epidemic of Q fever, 1138
isolation from milk of sheep in California epidemic, 1138
natural infection of *Hyalomma mauritanicum*, 822
mooseri
experimental infection, chloromycetin in, 1025
prowazeki
becoming *Proteus X*, 1135
experimental infection, chloromycetin in, 1025
suspension for the Giroud intradermal test, 1022
toxoid antigens of, 1022
variation of virulence by passage through lice, 1022
tsutsugamushi
in mites in Malaya survey, 1136
vaccine, preparation of, 348

Rickettsiae, *see also under* Typhus
antigenic relationships, 353
cotton rat suitable for experimental work, 817
cultivation in lice, 1022
experimental infection, inhibitory effect of anti-organ sera, 244
rabbit lung suspensions as antigen, 539
infection
treatment by penicillin, 246
vaccines, enhancement by water-in-oil suspensions, 819

Rickettsial Diseases of Man [SOULE and MOULTON] (book review), 590

Rickettsialpox, locality records, 1025

Ringworm in Calcutta, 570

Rockefeller Foundation, International Health Division Report, 1947, 299.

Roquessin *see* Conessine

R.P. 3038 *see* Nivaquine C
3377 *see* Nivaquine B

Rural Hygiene, Problems of, in Brazil [PESSÔA] (book review), 1191

Salicylic acid for impregnating clothes against typhus mites, 540

Salmonella typhi, cause of endocarditis in kala azar, 340

Sandflies *see Phlebotomus*
of North Ceylon, 974

Sanitation, Tropical, Manual of [BALFOUR KIRK] (book review), 1102

Sapindus extract as molluscicide, 266

Saponin in staining blood-parasites, 502

Sarcocystis muris in rodents of Asmara, 116L

Sarcophaga
fuscicauda, causing myiasis, 286
misera sarracenoides and transmission of *E. histolytica*, 937

Scabies in Calcutta, 570

Scapanus townsendii infection by Coccidioides, 496

Schistosoma
haematobium in cerebral granuloma, 378
diagnosis by bladder biopsy, 56
experimental infection by *Physopsis africana*, 150
extracapillary oviposition, 752
hatching speed of miracidia, 55
infection among East African tribes, 555
prevention of, 151
lesions in bladder, 56
life-cycle experiments, 151
ova in lungs, 57
rectum, 847
irregularity of excretion, 555
relation of output of ova to exertion, 556
self-infestation
ova in semen, 553
treatment by fuadin, 554
theory of oviposition, 946
infection
treatment
anthiomaline, (377)

Schistosoma—cont.
intercalatum, pulmonary symptoms in infestation by, 58
japonicum
action of immune sera on cercariae of *S. mansoni*, 55
in cerebral granuloma, 378
maintenance in laboratory, 1158
morphology of, 270
ova, optimum hatching conditions, 950
in returned soldiers, 61
snail hosts of, 559
mansoni
action of immune sera on cercariae of, *in vitro*, 55
antigen for intradermal reactions, 757
biological studies of the miracidium, 377
cercariae for CHR test, 1155
chromosomes and sex in, (1058)
diagnosis by rectal biopsy, 57
effect of chloramine on miracidia, 647
Miracil D on, *in vitro*, 753
experimental infection of *Australorbis glabratus*, 150
in mice, treatment by antimonials, 646
hermaphrodite strain, 55
hyaluronidase in cercariae of, 56
infestation, clinical evolution of, 377
rare in South Central Africa, 378
laboratory animals as experimental hosts of, 948
life-cycle experiments, 151
methods of infecting mice, 948
ova in bladder, 847
lungs, 57
wall of gall-bladder, 1060
pathological effects from infestation by males, in China, 756
rudimentary female embryos in, 1058
structure of body-covering, 1154
vector in Maracay, ecology of, 756
Schistosomatium douthitti
cause of dermatitis, 849
swimmers' itch, 849
Schistosome(s)
cercariae
study of penetration by, 949
varnish to prevent penetration, 151
dermatitis
in U.S.A., 849
Washington, 1061

SCHISTOSOMIASIS
in Africa, Central, 846
East, 555
Cairo, 643
Celebes, 59
Chengtu plain, 648
China, 60
Dominica, 558
Durban, 751
Egypt, 57, 150, 845
Espirito Santo, 643
Iraq, 554
Japan, Eastern, 482
Kenya, 151
Nairobi children, 432

Schistosomiasis—*cont.*
Philippines, 152
Portuguese East Africa, 1056
Scioa, 1033
Southern Rhodesia, 267
Syria, (150), 845
Szechuan, 647
bovis and carcinoma of liver, 1057
cancer of pancreas with, (379)
cerebral granuloma due to, 378
control
in China, 60
Egypt, 150, (380), 845
Kenya, 151
anticercarial methods
repellents
benzyl benzoate, 151
dimethyl phthalate, 151
copper salts, 151
DDT, 151
eradication of snails, use of copper sulphate, 845
Gammexane, 151
mechanical purification of water, 647
diagnosis
autopsy findings, 846
bladder biopsy, 267
and rectal biopsy, 378
CHR test, 1154
examination of faeces, 266
urine, 266
intravenous pyelography, 267
radiography, 267
rectal biopsy, 267
eradication of, 1060
experimental culture of snail vectors, 946
of genital tract, in Rhodesia, 644
haematobium
in Africa, East, 266
South, 947
Algeria (Fondouk), 1153
Baghdad, 846
India, 947
Portugal, 1056
carcinoma of liver and, 1056
diagnosis
bladder biopsy, 378
cystoscopy, 266, 267
miracidioscope, 1153
rectal biopsy, 378
snippings, 268
of female genital tract, in S. Rhodesia, 644
treatment
Miracil D, 753, 848, 947
japonicum
among Americans in World War II, 558
in China, 559
Szechuan, 429
diagnosis
rectal biopsy, (849)
experimental work with *Oncomelania quadrasi*, 270
treatment
experimental study of Miracil in, 481

Schistosomiasis—*cont.*
mansoni
in Belgian Congo, 754
Brazil, 847
Dominican Republic, 558
Kenya, 641
Paraná, 1058
Porto Rico, 558
Venezuela, 269
diagnosis, 757 (*bis*)
complement deviation, 758
faecal examination and rectal biopsy compared, 949
intradermal reactions, 757
liver biopsy, 759
rectal biopsy, 378, 481, 759, 949
experimental
hepatic lesions in, 1158
season and sex, 268
of female genital tract, in S. Rhodesia, 644
gall-bladder, 1060
intradermal reaction in, 1058
pathogeny of lesions, 269
splenectomy in, 269, 759, 1059
treatment, 480
anthiomaline, 558
antimonial, of experimental infection in mice, 646
Miracil D, 848
experimental study, 481
splenectomy for splenomegaly, 269, 759, 1059
Wassermann reaction in, 759
pulmonary, 57, 643
factor in Ayerza's disease, 847
X-ray appearances, 1055
recto-vesical, (150)
splenomegaly in, 269, 759, 1059
splenectomy for, 269, 759, 1059
treatment
anthiomaline, 59
antimonials, 269
indications for stopping antimony, 648
criteria of cure, 59
Fantorin, 380
Fuadin
effects on electrocardiogram, 61
relapse after, 554
Miracil D (Nilodin), 380, 556
sodium antimony tartrate, intensive course, 557
toxic symptoms, 557
tartar emetic
effect on electrocardiogram, 61
liver, (379)
intensive, 645
urinary among "healthy" East Africans, 555
vectors in Dutch Antilles, 754
Schistosomophora
robertsoni, host of *S. japonicum*, 559
slateri, host of *S. japonicum*, 559
Schumm's reaction, significance of, in blackwater fever, 616
Science, Indian Institute of, 1938-48, 880
Scleroderma wollastoni in Sierra Leone, 403

Scleroma
in Mexico, 970
Panama, 872
Sierra Leone, 403
geographical distribution, 872
pathological stages, 970
treatment, 872, 970

Scopulariopsis, liable to confusion with *Coccidioides immitis,* 1174

Scorpio maurus
in North Africa, 280
stinging by, in Palestine, 867
treatment by antivenene, 280

Scorpions
of North Africa, 280, 868
Palestine, 867
effect of DDT on, 493

Scorpionism by *Brachistosternus ehrenbergi,* 394

Scrub typhus *see* Typhus fever, mite-borne

Selenium as cause of lathyrism, 170

Sepsidae, coprophagous, biology of, 404

Shigella
boyd, causing dysentery in S. Persia, 633
flexneri, causing dysentery in S. Persia, 633
schmitzi, causing dysentery in S. Persia, 633
shigae, causing dysentery in S. Persia, 633
sonnei, causing dysentery in S. Persia, 633

Sicklaemia without anaemia, (280)

Sickle cell, blood donors with, 1169

Sierra Leone, peasant community, vital statistics of, 586

Signe en brosse in sickle cell anaemia, 967

Simaruba officinalis see also Carobinase

Simuliidae
of Anglo-Egyptian Sudan, (387), 404
Belgian Congo, 387
Chiapas, Mexico, 564
Madagascar, (1088)
Manitoba, 581
Mexico, identification of, 407
new species in, (876)
Queensland, 406
control in Central America, 442
DDT, 583
Gammexane, 583
Gigantodax, 407
wing venation, 171

Simulium spp., vector of *T. carateum,* 869
adersi in Anglo-Egyptian Sudan, 404
albivirgulatum, development of O. volvulus in, 387
alcocki henrardi in Anglo-Egyptian Sudan, 404
bovis in Anglo-Egyptian Sudan, 404
callidum and onchocerciasis in Mexico, 564
vector of onchocerciasis in Central America, 565
cervicornutum in Anglo-Egyptian Sudan, 404
damnosum
in Anglo-Egyptian Sudan, 404
Belgian Congo, 387
dentulosum in Anglo-Egyptian Sudan, 404

Simulium—cont.
griseicollis
in Anglo-Egyptian Sudan, 405
Belgian Congo, 387
impukane in Anglo-Egyptian Sudan, 405
lepidum in Anglo-Egyptian Sudan, 405
mcmahoni in Anglo-Egyptian Sudan, 405
medusaeformis in Anglo-Egyptian Sudan, 405
metallicum
and onchocerciasis in Mexico, 564
vector of onchocerciasis in Central America, 565
neavei, vector of onchocerciasis in Kenya, 854
nigritarsis in Anglo-Egyptian Sudan, 405
ochraceum
and onchocerciasis in Central America, 565
Mexico, 564
ornatipes in Queensland, 407
ruficorne in Anglo-Egyptian Sudan, 405
sibirica (*Mallochianella sibirica*), 407
unicornutum in Anglo-Egyptian Sudan, 405

Siphonaptera of South America, 291

Siphunculina signata, possible vector of epidemic conjunctivitis, 1082

Skin
diseases in Calcutta, 570
schizogony of *Plasmodium falciparum* in, 7

SN 5241, skin reactions from use of, in malaria, 1111
7618 *see* Chloroquine
11,437 *see* metachloridine
tolerance of, in malaria, 904
12,080 *see* Colchicine

Snails
control in streams
palm-leaf traps, 646
molluscicides
copper sulphate, 266

Snakes (*see also* under Venoms)
of Argentine, 967
of French Equatorial Africa, 967
Peruvian, observations on, (81)
San Luis Potosi, Mexico, (866)

Snake-bite, 568, 967
in the Sudan, 866
malnutrition and, 866
Bothrops spp. in Argentine, 967
Crotalus terrificus in Argentine, 967
Eupalaestrus, two new species, (81)
Micrurus
corallinus in Argentine, 967
frontalis in Argentine, 967
lemniscatus in Argentine, 967
Pamphobeteus, Brazilian species, study of, (81)
Trichomonad, new, in, (146)
Trimeresurus, new species, (81)
Trimeresurus mucrosquamatus cantor, bite by, 568

SNP, toxicity for bugs and ticks, 814, 1131, 1188

Social Welfare Services in Morocco, 1947, 1097

Sodium anacardate as vermicide, 54
Soil erosion, prevention and control, 116
Solufontamide in tropical ophthalmology, 1177
Soroplasma see Toxoplasma
Sparganophorus vaillantii, larvae of mosquitoes and, 67
Sparganosis
in French Equatorial Africa, 761
Indo-China, 64
Sparrow, parasites of, 448
Spengler-Sphel method of staining granules of *M. leprae*, 842
Spider-bites
in Chile, 1169
Uruguay, 1076
Latrodectus mactans
prevention, (1076)
treatment, (1076)
Loxosceles
gangrene of skin from, 1076
haemoglobinuria from, 1076
haemolysis from, 1076
Scytodes globula, cutaneous effects of, 1169
Spirocerca sanguinolenta in Szechuan dogs, 376
Spirochaeta
duttoni
louse as vector, 471
plurality of strains in Belgian Congo, 836
var. *crocidurae*, failure of louse transmission, 1048
latyschevi
transmitted by *O.tartakowsky*, 44
in Usbekistan, 44
merionesi
in South Morocco, 43, 836
experimental infection of *Macaca sylvana*, 836
white mice, 836
microti
in Iran, 43
experimental infection of rodents, 1048
transmission by *O.canestrini*, 44
O.lahorensis, 44
natural infection of *Tatera indica*, 1048
transmitted by *Pediculus humanus*, 44
naganophila, 43
novyi, electron-microscope study of, 835
obermeieri, see Sp. recurrentis
persica
in Iran, 43
Tobruk and Palestine strains compared, 471
recurrentis, electron-microscope study of, 835
species isolated from the Persian gerbil, (*Tatera indica*), 262
Spirochaetes
in North Africa epidemic, study of, 42
reclassification of, 44
Spleen, abscess of, in the tropics, 1084
Splenic abscess, primary, in Rhodesia, 574
Sporotrichum schencki infections lesions. 1079
SPRUE, 77, 279-280, 391-392, 658-661, 770-771, 861-863, 964-965, 1073
in India 770, 861, 965
Italian prisoners of war, 658
Porto Rico, 391
Venezuela, 279
aetiological features, 965
anaemia
effect of injection of animal protein factor concentrate, 1073
megaloblastic
treatment by pteroylglutamic acid, 80
treatment
vitamin B_{12}, 167
parenteral, 864
clinical features, 658
criteria of progress, 861
cyclic evolution of, 862
diagnosis, 279, 770
faecal fats and fatty acids, determination of, 660
folic acid deficiency in, 661
ileus in, 661
investigation diets in, 861
non-tropical
treatment by folic acid, 77
pathogenesis of, 658, 770, 964
prognostic features, 965
proteolytic activity of gastric enzyme, 1073
symptoms, 965
treatment
diopterin, 661
folic acid, 77, 771
and liver extract compared, 965
laparotomy, 392
liver, 660
mode of action, 862
sulphaguanidine, 660
teropterin, 391
thymine, 80, 279
vitamin B_{12}, 391, 566
vitamin K deficiency in, 661
Stagnicola
emarginata angulata, vector of cercariae causing swimmers' itch, 849
palustris, vector of cercariae causing swimmers' itch, 849
Stefansky's bacillus *see* Leprosy in rats
infection of mice not "leprosy", (147)
Stibophen in treatment of onchocerciasis, 1162
Stilbamidine
effect of light on, 916
pharmacology of, 916
Streptococcus faecalis in intestinal amoebiasis, 257
Streptomyces aureofaciens see Aureomycin
Streptomycin
action on cultures of *E. histolytica*, 549
and chaulmoogra combined in leprosy, 372
in tuberculous leprosy patients, 1150
Strongyloides
experimental infection of the rat, eosinophilia in, (154)

Strongyloides stercoralis
in Gabon estuary, 844
Portuguese Guinea, 844
returned soldiers, 61
clinical manifestations of infection with, 383
creeping eruption due to, 652
development stages, 650
eruptions associated with, 652
infection among ex-prisoners of war, 651
causing "bathing-drawers" eruption, 652
larvae in unusual sites, 383
lesions due to, 651
sanitary problem in Brazil, 853
treatment by gentian violet, 383

Strongyloidiasis
diagnosis
antigen for, 955
intradermal reaction, 955
precipitin reaction, 955

Sulphabiguanide derivatives in malaria, (114) (*bis*)

Sulphadiazine in toxoplasmosis, 1185

Sulphamerazine in toxoplasmosis, 1185

Suncus caeruleus in Rangoon, 256

Sunlight, cutaneous response to, 569

Suramin
estimation in blood, 337
plasma, 338
serum, 337
in treatment of Onchocerciasis, 855

Survey, Demographic, of the British Colonial Empire. Vol. I. West Africa. [KUCZYNSKI] (book review), 508

Surveys, *see* Reports and Miscellaneous Papers

Swarming gnat of the Sudan *see Oscinis pallipes*

Swimmers' Itch, due to non-human cercariae, 849
in Washington, 1061

Sword bean dermatitis, 73

Sylvilagus floridanus as reservoir host of *F. hepatica* in Texas, 62

Syphilitic roseola, diagnosis from leprosy, 368

Tabanidae of Manitoba, 581

Tabanus spp. as vectors of disease, 875

Tabardillo *see* Typhus Group of Fevers

Taeniasis in Nairobi children, 432

Takata-Ara test in cirrhosis of the liver, 161

Tanganyika Territory
Native Authority Dispensary System, 99
Report on water resources, 676

TAPEWORM INFECTION
in Durban, 751
Portuguese Guinea, 844
extracts causing cutaneous manifestations, 653
immunity to, 380

Tapeworm Infection—*cont.*
Diphyllobothrium in Kenya, 70
erinacei, immunity, 380
latum infection
anaemia
bone marrow picture, 483
treatment
folic acid, 154
liver, 483
immunity, 380
mansoni, plerocercoids in animals in Indo-China, 64
Hymenolepis infection
diminuta premunition, 381
nana, immunity to, 381
var. *fraterna*, immunity, 381
Inermicapsifer infection
arvicanthidis
human infection in Kenya, 952
rodent hosts of, 952
cubensis in Cuba, 952
Ligula intestinalis, premunition, 380
Taenia
hydatigena in dogs in Szechuan, 376
saginata infection
in Kenya, 641
Portuguese Guinea, 844
Scioa, 1033
Tropical Africa, 65
Venezuela, 273
premunition, 380
treatment
atebrin, 650
appendicitis and, 578
ova
effect of sand filtration on, 851
sewage sedimentation on, 851
sludge on, 851
proglottides in appendix, 65
toxic extracts from, 851
solium infection
in Portuguese Guinea, 844
Scioa, 1033
Venezuela, 273
premunition, 380
treatment
atebrin, 650

Tarsonemus and tropical eosinophilia, 577

Tatera indica, natural infection by *S. microti*, 1048

Tenebrio molitor
in man, 1089
larva infection by Rickettsia, 451

Tephrosia leaf as molluscicide, 266

Termites, maintenance of cultures in the laboratory, 975

Teropterin in treatment of sprue, 391

Thalazia callipaeda in dogs in Szechuan, 376

Thiophosphate o'diethyl o"paranitrophenyl *see* SNP

Thromboangiitis obliterans in Gold Coast woman, 873

Thrombophlebitis, tropical, as cause of gangrene, 1086

Thymine in macroscopic anaemia, 80
pernicious anaemia, 80
treatment of sprue, 80

Tick-bite fever
treatment
aureomycin, 1025, 1137

Ticks
American dog-tick
biology of, (930)
control of, (930)
artificial inoculation with Rickettsiae, 624
egg-waxing organ in, (94)
Lone star *see Amblyomma americanum*
Long Island, host relationships of, 821
repellents, laboratory evaluation, (95)
toxicants, laboratory evaluation, (95)
toxicity of S.N.P. for, 1188

Tifa *see* Todd Insecticidal Fog Applicator

Tinea albigena *see Trichophyton albisicans*
capitis, treatment, 496
nigra in Panama, 83

Todd Insecticidal Fog Applicator for mosquito control, 291

Tongue
black, 164
blue, 169
pigmentation of, in Africans. 169
African children. 400

Toxocara
canis
in dogs in Szechuan, 376
vermicidal activity of Cashew oil on, 54
cati
treatment with synthetic ascaridol, 384

Toxoplasma
antigens
dermal sensitivity to, 402
preparation of, 402
in S. Carolina birds, 616
conjunctiva, 170
results of intraperitoneal inoculation in mice, 1186
its place in Nature, 972
cunicula in a dog, 875

Toxoplasmins *see Toxoplasma* antigens

TOXOPLASMOSIS [BINKHORST] (book review), 595
in Australia, 875
England, 401
Panama guineapig. 875
Persia, 170
canine
in Morocco, (875)
clinical types of, 1184
congenital, 403
in mice, treatment by sulphadiazine and antiserum, 875
diagnosis by serological methods, 1185
experimental
chemotherapeutic study, 92
infection of *Xerus getulus*, (875)
human, in Perth, Australia, 875
congenital transmission, 874
diagnosis, serological, 973
pathogenesis of, 1184
treatment by sulphonamide drugs, 1185

Trachoma in Afghanistan, 1176
treatment by solufontamide, 1177

Trematode infections among Americans in World War II, 558

Treponema, see also Spirochaeta
carateum, synonyms of, 868

Treponematoses
absence of cross-immunity, 1171
American origin of, 1171

Triatoma spp.
S.N.P. as insecticide, 814, 1131
carrioni, experimental infection with *T. cruzi*, 1017
coxorufa, infection by *T. cruzi*, 1017
dimidiata, vector of *T. cruzi* in Ecuador, 1017
capitata, natural infection with *T. cruzi*, 1017
infestans
in Brazil, 125
control by Gammexane, 20.
natural infection by *T. cruzi* in Brazil, 125
rate of infection by *T. cruzi* in Chile, 1128
rearing of, 242
vector of *T. cruzi* in Minas Gerais, 620
longipes, natural infection with *T. cruzi*, 619
megista, rearing of, 242
protracta, natural infection with *T. cruzi*, 619
woodi, natural infection with *T. cruzi*, 619
rubida uhleri, natural infection with *T. cruzi*, 619
rubrofasciata in Brazil, 125
rubrovaria, rearing of, 242
sordida in Brazil, 125
biology of, 1017
natural infection by *T. cruzi* in Brazil, 125
Minas Gerais, 620

Triatomidae of Brazil, 124
control
chlordane, 449
DDT, 449, 1129
Gammexane, 20, 449, 1129
S.N.P., 814, 1131
Sulphos, 814
Thiophos, 814
control of diseases transmitted by, (501)
domestic control,
Gammexane as fumigant, 535
in water suspension, 535
infectivity and distribution in Minas Gerais, 124
M.E.P.R.A. collection, (535)

Tricercomonas intestinalis
cultivation of, 834
in the Netherlands, 834

Trichinella spiralis
in cadavers in Mississippi, 488
hogs in Chile, 859
trapped rats in Chile, 859
blood plasma in infection by, 766
collection of live adults for antigen preparation, 71
duration of larviposition, 766
effect of digestion and refrigeration on infectivity, 388
radiation on, 962

Trichinella spiralis—cont.
immunity to, effect of alcohol on, (657)
intestinal phase of, 657
localization of, in mice, 656
milk as protective, 657

Trichiniasis
in Canada, North-west cattle (488)
Greenland, (71) (*bis*)
Mexico City, (388)
mice, (962)
Mississippi, 488
Santiago, Chile, 859
control in Chile, 859
effect of sulphonamides on experimental infection, 962
in rats, treatment by naphthoquinone, 489

Trichobilharzia
ocellata
causing dermatitis, 849
swimmers' itch, 849
cercariae causing dermatitis in Washington, 1061
physellae cercariae causing dermatitis in Washington, 1061
stagnicolae
cause of dermatitis in U.S.A. 849
swimmers' itch, 849

Trichocephalus dispar infection
treatment by arsenicals, 388

Trichomonas, differentiation of species by immunological methods, 92
in Scioa, 1033

Trichomonas
hominis, growth requirements of, 634
intestinalis as cause of diarrhoea in man, 834
in Gabon estuary, 844
infection
treatment
emetine, 834
gentian violet, 834
stovarsol, 834
natricis
in *Natrix natrix*, (146)
viperinus, (146)
conditions of development, (146)
culture of, (146)
haematophagy of, as test for pathogenicity of intestinal parasitism, (549)
vaginalis, growth requirements of, 634

Trichophyton
albisicans, Is it Indonesian pinta? 1078
interdigitale infection in Singapore, 1077
mentagrophytes infection in Singapore, 1077
rubrum infection in Singapore, 1077

Trichostrongylus in returned soldiers, 61
orientalis infection in China, 273
ova differences from *Ancylostoma*, 273
retortaeformis, distribution and habitat of larvae, (66)

Trichuriasis in Portugal, 1062
treatment
hexylresorcinol, 485
tetrachlorethylene, 485

Trichuris infection
in animals at Rome Zoological Gardens, 179
American returned soldiers, 61
Durban, 751
Gabon estuary, 844
Okinawa autopsies, 155
Philippines, 152
Portuguese Guinea, 844
São Paulo, (70)
Scioa, 1033
Venezuela, 273
trichiura
appendix infection, (70)
treatment of infection by
arsenicals, 388
Chenopodium ambrosioides, 954
vulpis, vermicidal activity of Cashew oil on, 54

Trimeresurus mucrosquamatus cantor, bite by, 568

Trombicula
akamushi, infected by Rickettsia in Malayan survey, 1136
alfreddugèsi affecting man in N. America, 877
tropica affecting man in N. America, 877
autumnalis, collection of larvae, 132
batatas affecting man in N. America, 877
deliensis
collection of larvae, 132
infected by Rickettsia in Malayan survey, 1136
laboratory breeding of, 132, 721
life-history of, 820
possible variant of *T. akamushi*, 820
suspected vector of typhus fever in Simla Hills, 820
transmitter of *R. orientalis* by bites of larvae, 721
splendens affecting man in N. America, 877

Trombiculid mites
affecting man, 176 (*bis*) 877
bionomics of, 176
North American, (410)
transmission studies, 176
trapping methods, 132

Trombidiidae, critical review, (499)

Tropical diseases
in Brazil, discussion on, 190
cardiac conditions in, (784)
diagnosis, microscopical, 177
Tropical eosinophilia *see* Eosinophilia
Tropical ophthalmology *see* Ophthalmology

Tropicaloid ulcer *see* Ulcer, Tropical, Mycetoid desert sore

Tropicorbis
havanensis vector of *S. mansoni*, 1058
isthmicus in Dutch Antilles, 754

Tropics
environment and disease in, 572
Health Hints for, 100
White settlers in the, 1190

Tropidonotus piscator
intermediate host of *Diphyllobothrium mansoni*, 560
sparganosis in, 64

Trypanosoma in S. Carolina birds, 616
brucei
in Gambia, 229
Africa, West, 222
attempts to infect man experimentally, 813
differences between strains, (714)
differentiation of, 812
effect of antrycide on, 339
ultrasonic waves on, 241
group inter-relationship, 236
survival in *Ornithodorus*, 18
Triatoma, 18
treatment of infection by,
antrypol, 223
congolense
in Gambia, 229
Gold Coast, 221
West Africa, 222
acquired resistance to antrycide, 920
cyclic transmission by *G. palpalis*, (19)
effect of antrycide on, 339
infection
treatment
dimidium bromide, 339
phenanthridinium, (126), 223, 339
xenodiagnosis, (19)
conorrhini in French Guiana, (924)
cruzi
in insects of Arizona, 619
Octodon degus, 449
rodents of Arizona, 619
cultivation in chick embryo, 340, 534
liquid media, 714
culture lysates, effect on mice, (242)
effect of hyaluronic acid and hyaluronidase on, 549
purification by antibiotics, 534
experimental infection by, 619
treatment
pamaquine group, 1131
pentaquine, 1131
infection among blood-donors in Brazil, 813
in Uruguay, 241
cardiac disease and, 60
complement fixation in, 20
mammals naturally infected in U.S.A., 923
equinum, effect of antrycide on, 339
equiperdum, effect of antrycide on, 339
ultrasonic waves on, 241
experimental infection, *p*-phenylene diguanidine in, 1128
for *in vitro* testing of trypanocidal activity, 920
prophylaxis, (920)
evansi, 236
effect of antrycide on, 339
ultrasonic waves on, 241
human laboratory infection, 1015
gambiense
in Africa, West, 222
and Central, 123
Fernando Pó, 124
action of aromatic diamidines on, 916
differentiation of, 812
effect of ultrasonic waves on, 241
enhancement of virulence by passage, 236
Trypanosoma—cont.
gambiense—cont.
infection of animals in Fernando Pó, 124
laboratory infection by, 917
oral chemoprophylaxis in the rat, 337
survival in *Ornithodorus*, 18
Triatoma, 18
grayi infecting *G. palpalis*, 1127
hippicum
effect of zinc-insulin on, (448)
metabolism of, (714)
survival in *Triatoma*, 18
infection and ascorbic acid metabolism in the rat, 241
kalwanensis
in India, 126
infecting *A. culicifacies*, 126
lewisi in rodents of Asmara, 1161
rangeli infection
in America, in man, 923
dogs, 923
Argentine, 1132
rhodesiense
in Africa, East, 123
differentiation of, 812
effect of antrycide on, 339
ultrasonic waves on, 241
survival in *Ornithodorus*, 18
simiae
in Africa, West, 222
acquired resistance to antrycide, 919
uniforme in Belgian Congo, 224
vivax
in Africa, West, 22
Gambia, 229
Gold Coast, 221
acquired resistance to antrycide, 920
effect of antrycide on, 339
infection, treatment by phenanthridinium, 223
Trypanosomes
action of suramin on, 1127
and antrycide compared, 1127
drug resistance of, 1016
electrical charge of, 811
fluorescence microscope examination for, 237
interference effect of arseno compounds, 915
phenomenon, categories of, 915
metabolism, action of suramin on, 914
polymorphic, differentiation of, 812
trypanocides, chemistry of, 238
ultrasonic waves, effect on, 241
vital staining for, 237

TRYPANOSOMIASIS, 18-21, 122-126, 221-242, 336-340, 448-449, 530, 535, 617-621, 711-714, 811-814, 913-924, 1012-1018, 1127-1132
animal
in Africa, Portuguese East, 531
West, 530
Belgian Congo, (338)
Gambia, 229
Gold Coast, 226
Sierra Leone, 228
control by antrycide, 920

Trypanosomiasis—*cont.*
animal—*cont.*
treatment
antrycide, 338
acquired resistance to, 919
dimidium bromide, (814)
MSb in experimental infection, 918
phenanthridinium, 223
compounds, (126)
bovine in Kivu, (448)
phenanthridinium in, (19)
epidemiology in man and animals, 235
experimental, rôle of potassium as cause of death, 619
human, African (sleeping sickness)
in Africa, 123
East, 231
Belgian Congo, 224, 913
British West Africa, 221
Fernando Pó, 124
French Guinea, 712
French Equatorial Africa, 1907-1948, 1012
French West Africa, 123
Gambia, 222
Gold Coast, 221
Kenya Colony, 237
Liberia, 224
Mozambique, 530
Nigeria, 221
Northern Rhodesia, 532
Portuguese East Africa, 531
Portuguese Guinea, 530, 1013
Portuguese West Africa, 530
Sierra Leone, 222, 227, 238
cerebrospinal fluid, estimation of proteins in, 914
"close impersonal" contact with Glossina, 229
"close personal" contact with Glossina, 229
control
aggressive clearing, 223
Anchau Settlement Scheme, 229
Anglo-Egyptian Sudan, 224
Angola, 530
clearing methods in East Africa, 233
defensive clearing, 223
game destruction in East Africa, 233
Mozambique report for 1947, 984
Northern Rhodesia, 532
Game and Tsetse Report, 1945, 1946 and 1947, 531
reclamation methods in East Africa, 233
West Africa, British, organization of, 223
French, 224
Gold Coast, 226
Liberia, 224
diagnosis in West Africa, 222
entomological problems in East Africa, 232.
Foréami report, 1939-1945, 913
glucose content of blood, 914
cerebro-spinal fluid, 914
ocular lesions in, 1177

Trypanosomiasis—*cont.*
human, African (sleeping sickness)—*cont.*
prophylaxis
antrypol, 223
pentamidine, 123, 223, 1015
propamidine, 239
protozoal problems and research in East Africa, 232, 234
research, suggestions for, in the Gambia, 229
Gold Coast, 227
reservoir hosts, 235
Sleeping Sickness Service in Portuguese Guinea, 530
Summary of Recent Abstracts, 419-425
transmission
Tabanids, 235, 236
tsetse flies, 235 (*see also* under species)
treatment
antrycide, fluorimetric determination of, (813)
antrypol, 222
and tryparsamide, 222
arsenicals, resistance to, 533
arsenophenylbutyric acid (70A), 223
assay of neoarsphenamine, (448)
Bayer 205, 124
diamidines compared, 919
lomidine, 917, 918 (*bis*)
effect on blood-sugar, 918
melarsen, 238
oxide, 239, 711
Mel B, 711
pentamidine, 222
p-phenylene diguanidine, 1128
suramin (Antrypol, Bayer 205) estimation in blood and serum, 337
tryparsamide, 124
and 70 A. 919
TPB, 711
problem in Africa, 122
veterinary aspects, 236
human, American (Chagas's disease)
in Brazil, 124
Catamarca, 534
Chaco, 534
Chile, 449, 1128
Corrientes, 534
Ecuador, 1017
Entre Rios, 534
Formosa (South America), 534
Minas Gerais hospital, 620
Uruguay, 241, 619
cardiopathy in, 340
complement fixation in, 20, 1129
control
DDT, 449, 1129
Gammexane, 20, 449, 1129
"Rhodiatox", 1131
S.N.P., 814, 1131
diagnosis
complement fixation, 20, 1129
precipitin reaction, 125
xenodiagnosis, 241 (714)
Borzone's modification of Brumpt's method, 1017
in school-children, 534

Trypanosomiasis—*cont.*
human, American (Chagas's disease)—*cont.*
electrocardiographic changes in, 1130
reservoir hosts, 236
risk of, by blood transfusion, 813
social importance in Minas Gerais, 620
transmission by blood-donors, 1129
triatomidae naturally infected in U.S.A., 923
Tsetse flies *see* Glossina
mechanism of feeding, 515
Fly and Trypanosomiasis Committee report 222, 224, 229, 231
Tsutsugamushi disease, Comparative Study of Japanese and Tropical (Scrub Typhus) [HAYAKAWA] (book review), 788
(book review), 788
Tularaemia control in California, 500
Tunga penetrans, hypertrophy of female, 1089
Typhoid fever
agglutination of *Proteus OX19* in, 719
diagnosis, slide agglutination, 716.

TYPHUS GROUP OF FEVERS, 22-30, 129-135, 244-253, 343-354, 450-457, 536-542, 623-638, 715-727, 817-823, 927-932, 1021-1026, 1135-1138
in Calcutta, 718
County Tyrone, 927
Ethiopia, 450
Guadeloupe, 249 (*bis*)
Peiping, 346
Togoland, 348
" benign flea " in Ethiopia, 451
clinical study of German cases, 717
complement fixation in, (452)
control
in California, 500
County Tyrone, 927
combined dust and spray with DDT, 26
dusting with insecticides, 718
vaccination, 718
diagnosis
agglutination of *Proteus OX*19, 716
Weil-Felix reaction in Peiping, 245
endemic
in Calcutta, 718
Caracas, 718
Eritrea, 344
Florida, 247
Indian rodents, 26
Japan, 23
Kentucky, 625
Mexico, 536, 625
Persian Gulf rats, 25
Porto Rico, 132, 245
Rio de Janeiro, 1023
Western Australia, 346
absence from rats and fleas in Lanchow, China, 26
complement fixation, 347
in rats in Mexico City, 719
control
dusting with DDT, 347
DDT effect on *Cheopis* index, 247
survey of methods, (737)
in U.S.A., 247

Typhus Group of Fevers—*cont.*
endemic—*cont.*
cross-immunity with Panamanian strains of Q fever, 253
diagnosis
complement fixation, 246
Weil-Felix test, 246
experimental, DDT analogue and, 453
infection in guineapigs, para-aminobenzoic acid in, 246
Rickettsiae infection of guineapigs, 451
transmission, 247
rat-cannibalism and, 246
treatment
aureomycin, 453
chloromycin, 626
para-aminobenzoic acid, 452, 626
Pb 852, 540
serum, 1023
vaccination, antibody response to, 819
Weil-Felix tests of rats in Mexico City, 719
Widal agglutination in, 719
Epidemic typhus
in Anglo-Egyptian Sudan, 1021
Arabia, South-western, 1135
Bolivia, 131
Eritrea, 344
Germany, 717
Indo-China, 23
Korea, 23
Mexico, 130, 536
from endemic, 536
Okayama, Japan, 23
Peru, 537
Siberia, 248
Turkey, 343
Urundi, 22
blood chemistry in, 538
complement fixation in, 345
diagnosis
Weigl reaction, 25
Weil-Felix and Weigl tests compared, 25
difficulty of differentiation from murine, 23
erythrocytic sedimentation in, 539
laboratory infections, 716
otitis media in, 625
prognosis by erythrocyte sedimentation rate, 539
prophylaxis
DDT, 344
vaccination, 344, 539
Rickettsiae, infection of guineapigs, 451
sympathetic nervous system, disturbances of, (625)
Takata-Ara reaction in, 538
treatment
aureomycin, 539
chloromycetin, 27, 131, 626
para-aminobenzoic acid (PABA), 130, 628
serum, 1023
vaccine, (131)
experiments, 817
vectors in U.S.S.R., 248
Epidemic bronchopneumonia, development in arthropods, 541

Typhus Group of Fevers—*cont.*
Exanthematic typhus [Fonseca *and* Wohlwill] (book review), 1195
First Inter-American Conference, 715
immunity
effect of splenectomy, 928
mite-borne
tsutsugamushi disease
in Assam, 133
Batavia, 1024
Burma, 133
Calcutta, 718
China, 1024
Ethiopia, 451
India, 719, 721
Malaya (scrub typhus), 247, 1135
breeding of *Trombicula deliensis* in the laboratory, 721
clinical features, 133, 719
diagnosis in laboratory, 719
infection after vaccination, 722
persistence of Rickettsia in the blood, 1024
prophylaxis
chloromycetin, 453
impregnation of clothes, 540
treatment
chloromycetin, 27, 453, 626, 1136
para-aminobenzoic acid, 28, 626
unusual features, 1024
vaccine, 27, 348
no protective value, 1137
murine *see* Endemic typhus
optic neuritis in, 452
unsuitable name for many Rickettsial diseases, 248
Proteus OX19
agglutination in pregnancy, 129, 538
antibodies in typhus and other patients, 24
common antigenic factor with Rickettsiae, 927
glucolipoid extract, Weil-Felix reaction and precipitation of, 130
Q fever, (626)
in Anatolia, 352
Britain, 454
California, 252, 352, 353, 454, 727, 932, 1138
Germany, 351
Greece, 28
Israel, 1026, 1137
Panama, 455
Pennsylvania, 455
Rumania, 627, (930), 931
Switzerland, 134, 454
Texas, 726
U.S.A. cattle, 456
a cow, 353
clinical aspects in California, 727
features, 932
complement fixation in, 1026, 1137
sheep and goats in California, 1138
U.S.A., 726
conglutination complement absorption test in, 456
control in California, 500
cross-immunity of Morocco, Ankara and Izmir strains, 352

Typhus Group of Fevers—*cont.*
Q fever—*cont.*
diagnosis
complement fixation, 627
from atypical pneumonia, 352
retrospective in Rumania, (931)
disproof of, in New Zealand, 932
encephalitis in, 1026
experimental in cattle, 135, 726
Aëdes aegypti not a transmitter, 455
Dermacentor andersoni a capable transmitter, 455
house-fly a mechanical transmitter, 456
not a capable transmitter, 456
history, 726
immunity reactions between Panamanian strains and endemic (murine) typhus, 253
laboratory infection, 253, 626, 931, 1026
possible, 455
laundry infection from soiled clothes, 457
milk as source of infection, 28, 29
Pasteurization and, 823
post-mortem findings in, 822
probable dust infection, 626
serological tests compared, 456
survey, (541)
epidemiological, in Southern California, 454
susceptibility of fleas to Rickettsia of, 818
treatment
aureomycin, 932
streptomycin, (457), 932
veterinary public health significance of, (134)
reticulocytes in, 928
Rickettsia spp.
common antigenic factor in, 927
recovered from *Hydromys humei* in Palel, 722
rats in Palel, 722
tree shrew, 722
Tupaia belangeri, 722
Rickettsia
akari, cause of Rickettsialpox, 248
burneti
antigens, specificity of, 727
in butter, 455
cows, 455
raw milk in Texas, 726
cause of "virus pneumonia", 29
complement fixation with syphilitic sera, 727
infection of man and animals in Greece, 29
laboratory infection, 931
relationship with organism of epidemic bronchopneumonia, 541
strain differentiation, 931
survival *in vitro*, 627, (930)
mooseri
infection of insects with, 451
inoculation of fish, 625
nomenclature of, 452
variation in growth habits, 623

Typhus Group of Fevers—*cont.*
Rickettsia—*cont.*
orientalis
immunity to, experimental, 723
Karp strain, pathogenicity, 930
transmitted by bites of larvae of *T. deliensis*, 721
prowazeki
antigen from lung of infected rabbit, 717 (*bis*)
cultivation in ticks, 624
cytological structure, 928
infection of insects with, 451
fish, 625
reduced pathogenicity for immunization, 24
transformation to *R. wolhynica*, 716
variation in growth habits, 623
rickettsi, antirickettsial action of aureomycin, 725
tsutsugamushi see R. orientalis
wolhynica
isolation from lice from trench fever patients, 627
transformation to *R. prowazeki*, 716
Rickettsiae
complement fixation tests, 346
cultivation of, 134
diseases due to, in Martinique, (451)
in lungs of rats in Catania, Sicily, 131
metabolism of, 927
study of relationships, 623
synthetic and fermentation chloromycetin compared, 626
toxins of epidemic and murine compared, 24
treatment
aspirin, 345
chloromycetin, 626
Scrub typhus *see* mite-borne, tsutsugamushi disease
splenectomy and experimental infection, 928
Summary of Recent Abstracts, 887-896
tick-borne
in Brazil, 349, 930
Eritrea, 344
Ethiopia, 451
Mexico, 134
Palestine, 820
Cytochrome C and prolongation of incubation, 626
neotropical, 349
of Brazil, possible infection of man from goats, 726
Rocky Mountain spotted fever
in Florida, 349
Mexico, 134
São Paulo, 349
U.S.A., 251
control in California, 500
diagnosis
Bengtson's reaction, 349
from murine typhus in Palestine, 821
ecological effects of deforestation, 724
settlement, 724
experimental, immunity in guineapigs, 723

Typhus Group of Fevers—*cont.*
tick-borne—*cont.*
Rocky Mountain spotted fever—*cont.*
protection by aureomycin, 725
pathogenesis of circulatory failure, 724
prevention
dibutyl phthalate, 724
crude oil for ground, 724
Gammexane dust, 724
reservoir hosts in Brazil, 349
treatment
aureomycin, 251, 350 (*bis*)
chloromycetin, 250, 626
para-aminobenzoic acid (PABA), 249, 350, 626
vaccines
anaphylactogenic properties, 252
immunogenic properties, 252
Spotted fever of Mexico, 134 (*bis*)
strain from *Haemaphysalis leachi* in Palel, 722
Trench fever, 716
diagnosis
louse test, 627
vaccines
dog-lung and immunity, 929
evaluation by complement fixation, 346
immunity caused by, 929
mouse-lung and immunity, 929
yolk-sac and immunity, 929
Weil-Felix reaction in, 129
in wild rats in Porto Rico, 132
Typhus-malaria, combined control by DDT, (16)
Tyroglyphus and tropical eosinophilia, 577
Tyrosine index
in malaria, 321
schistosomiasis mansoni, 321
Uganda Protectorate, report on water resources, 676
Ulcer, rodent, in Calcutta, 570
ULCER, TROPICAL, 86-88, 285-286, 397-398, 781-783, 969-970, 1083-1084, 1179-1181.
in Africa, East, 285
Assam, Northern (Naga sore), 87
Madras, 969
Nyasaland, 285
Somaliland, 781
aetiology, 1179
Diplococcus tropicus, 782
skin anoxia and infection, 286
trauma, 781
bone lesions in, 782
elongation of leg in, 783
Kahn test in, 782
mycetoid desert sore, 398
organisms associated with, 969
pyogenic, 398
septic, 398

Ulcer, Tropical—*cont.*
treatment, 397, 1083
Aerva tormentosa, 781
aluminium, 87
Exadyl intra-arterially, 1181
and novocaine intra-arterially, 1181
sympathetic lumbar infiltration, 1181
extradural block, 285
lalis bark, 781
Marfanil, 969
penicillin, 969
surgical, (970)
varieties, 397
Veldt sore, 398
Uncinaria stenocephala, in dogs in Szechuan, 376
Uranotaenia
lowi in Bonaire, 675
ornata
var. *musarum*, breeding in plant axils, 172
Vallisneria spiralis and cultivation of *B. truncatus*, 946
P. boissyi, 946
Vectors, arthropod, control, 500
Venezuela, survey of natural history, (100)
VENOMS AND ANTIVENENES, 81-83, 280-281, 393-394, 493-494, 568-569, 775-777, 866-868, 967-968, 1076, 1169, 1170
bee-stings
symptoms, 569
treatment
calcium gluconate, 569
poisonous fauna of Argentine, 967
scorpions
of Argentine, 968
Mexico, 775
North Africa, 280, 775, 868
Palestine, 867
Brachistosternus ehrenbergi, 394
Buthus occitans, 776
Centuroides limpidus, 776
noxius, 776
Hottentota gentili, 776
Mexican and North African compared, 775
Prionurus
amoureuxi, 776
australis, 776
hoggarensis, 776
Scorpio maurus, 776
physiological actions of, 776
symptoms, 867
treatment by serum, 280, 867
Snake
agglutination of red cells by, 1076
Bothrops, release of bradykinin from plasma by action of 866
jararaca, 82
"spreading factor", 82
Bungarus caeruleus, detoxification by carbolic soap, 867
Copperhead
agglutination by, 1076
haemolytic action of, 1076
Coral, of Argentine, 967
Venoms and Antivenenes—*cont.*
Snake—*cont.*
Crotalus
adamanteus, haemolytic action, 1076
terrificus, dermatotoxic action, 82
flocculation with antivenom, 82
"spreading factor", 82
Daboia, mode of action, 775
Haemolysis caused by, 1076
Moccasin
agglutination by, 1076
haemolytic effect of, 1076
Vipera ammodytes, hypersensitiveness in man and animals, (1076)
Spiders
in Argentine, 968
Chile, 1169
Latrodectus
mactans, 1169
control
Gammexane, 569
physiological effects of, (1076)
symptoms, 394
treatment
calcium gluconate, 394
pallidus, 1169
revivensis, 1169
L.PIII-guttatus, 1169
Verrucosis, lymphostatic
in Kenya, 283
diagnosis from Mossy foot, 283
Verruga peruviana
in soldiers returned to U.S.A., 777
control by DDT, 1027
Vibrio cholerae, *see under* Cholera
Virus diseases among Africans, 971
Vitamin
glossitis and deficiency, 657
inability to use, as cause of glossitis, 658
A deficiency
diarrhoea and, 389
ocular and dermal lesions, 389
B deficiency
in Gold Coast, 278
pathological anatomy of, 1072
B_1 deficiency after locust visitation, 767
B_6 in pellagra, 389
B_{12} in blood regeneration, 566
macrocytic anaemia, 80
pernicious anaemia, 80
sprue, 80, 391
C content of *Detarium senegalense*, 1096
deficiency and petechiae in malaria, 903
in treatment of blackwater fever, 913
Vitiligo, diagnosis from leprosy, 369
Viviparus
javanicus, second intermediate host of echinostome in Java, 63
rudipellis, second intermediate host of echinostome in Java, 63
von Halleberg method of staining *M.leprae*, 842
Wasp, Bethylid, in Sierra Leone, 403
Water-plants and culture of snail vectors of schistosomiasis, 946

Watsonius watsoni, rearing of, 482

Weil's disease in Ecuador, 573

Weil-Felix reaction in typhus and non-typhus fevers, 245

Why our Children die. Causes and Suggestions for Prevention of Infant Mortality in West Africa. [ONABAMIRO] (book review), 885

Wuchereria see also Filariasis
  bancrofti
    in Ceylon mosquitoes, 486
    index in Martinique, 274
    infection
      in Anglo-Egyptian Sudan, 957
        Curaçao, 408
        Netherlands Windward Islands, 408
      elephantiasis and, 385
      treatment
        anthiomaline, 1162
        arsenamide, 69
    nature of embryo sheath, 762
    transmitted by *A. farauti* in New Guinea, 1105
      A. gambiae in Portuguese Guinea, 1105
      A. punctulatus in New Guinea, 1105
  malayi
    elephantiasis and, 385
    in Ceylon mosquitoes, 486
    infection in a child of 13 months, 274

"*Wuchereria pacifica*", elephantiasis and, 385

Xanthosoma sagittifolium and mosquito breeding, 173

Xenohaemoculture *see* Xenodiagnosis, 241, (714), 534, 1017

Xenopsylla
  astia
    on rats in Rangoon, 256
      Saigon, 357
  cheopis
    on rats in Kentucky, 625
      Mexico, 819
      Mexico City, 499
      Rangoon, 256
      Saigon, 357
    reduction by dusting with DDT, 247, 347

Ya Tan Tze *see Brucea javanica*

Yam, Poisonous Wild Cluster *see Dioscorea dumetorum*

Yamamoto method of staining *M. leprae* to distinguish from *M. tuberculosis*, 843

Yarará, local name for Argentine *Bothrops*, 967

YAWS, 45, 472-476, 549-552, 839, 1049-1050
    in Haiti, 551
      Indo-China, 1049
      Sierra Leone, 549
      soldiers returning to U.S.A., 777
      Sumatra, 45
      Uganda, 472
  age-incidence, 550
  bone lesions of, 472, 839
    compared with those of syphilis, 476
  campaign in Sierra Leone, 549
  classification of, 472
  control, 551
  evolution according to age, 550
  incidence, hygiene and, 550
    season and, 550
    social status and, 550
  secondary
    as social disease in Indo-China, 1049
    and tertiary stages, lesions of, 1050
  treatment
    arsenicals, 550
    bismuth, 45, 550
  mapharsen, 45
      and bismuth combined, 45
    penicillin, 551
    STB, a new trivalent arsenical, 839

YELLOW FEVER, 136-137, 355, 457-458, 542-543, 629, 823-824, 932-933, 1027
      in Belgian Congo, 136
        Panama, outbreak, 1139
  control by DDT, 355
  epidemic among monkeys in Semliki forest, Western Uganda, 823
      in Central Africa, 932
  epidemiology, complement fixation test in, 137
  immunity among animals in Belgian Congo, 136
    duration of, 542
  isolation of virus from *Aëdes africanus*, 457
  jungle
      in Brazil, 1027
        Kenya, 542
        Uganda, 823, 932

Yellow fever, malaria and filariasis [GIGLIOLI] (book review), 183
  monkey to man infection in Central Africa, 933
  Nigeria Mission Report, (353)
  prophylaxis
    vaccine 17D and French strain compared, 355
  Summary of Recent Abstracts, 101-102
  transmission by *Aëdes africanus*, 457, 458, 823
  vaccination by 17D, reactions from, 629
  variation of antibodies in monkeys, 137

Zoophilism of mosquitoes in Southern France, 1103

Zootermopsis angusticollis, laboratory culture of, 975

INDEX OF COUNTRIES

EUROPE

Corsica
Anopheles, 315
malaria, 315
plague, 736
rabies, 728

Czechoslovakia
Anopheles of Bohemia and Moravia, 800

Europe
malaria, 425

Finland
Anopheles, 205
haemoglobin values, 1074
malaria, 205.

France
amoebiasis in Paris, 362
Anopheles, 1103
cholera epidemiography, (143)
coenurosis, 950
dysentery, 941
fascioliasis, (153)
Hymenolepis, 951
malaria, 112, 695, 696, 949, 1103

Germany
Anopheles, 426
helminthiasis, 1054
malaria, 426, 696
Q fever, 351
typhus, 717

Gibraltar
myiasis, 1178

Great Britain
amoebiasis, 42, 936
mosquitoes, 500
Q fever, 454
toxoplasmosis, 401

Greece
malaria, 316
Q fever, 28

Hungary
Anopheles, 896
malaria, 896

Ireland
typhus in Tyrone, 927

Italy
amoebae in animals in Rome, 179
Anopheles, 8, 315, 437, 800
coccidiosis, 942
enterobiasis, 1071
leishmaniasis, 1020, 1134
malaria, 8, 109, 114, 315, 513
Phlebotomus, 1134

Mediterranean area
amoebiasis in forces returning from, 362, 469
leishmaniasis, (340)

Netherlands
amoebiasis, 828
Anopheles, 315
malaria, 314

Poland
Anopheles, 1000, 1104, 1105
malaria, 999
rodent ectoparasites, 1144

Portugal
ankylostomiasis, 1062
ascariasis, 1062
fascioliasis, 62
Phlebotomus, 94
schistosomiasis, 1056
trichuriasis, 1062

Rumania
Anopheles, 1115
deficiency diseases, 162
malaria, 1115
Q fever, 627, (930), 931
relapsing fever, 45, 838

Sardinia
malaria, 117, 605

Sicily
leishmaniasis, 128

Spain
leishmaniasis, 126
malaria, 427
myiasis, 93

Sweden
Anopheles, 205
malaria, 205

Switzerland
Q fever, 134, 454

U.S.S.R.
Phlebotomus, 535
typhus, in Siberia, 248

Yugoslavia
Phlebotomus, (675)

ASIA

Aden
amoebiasis, 939

Arabia
Anopheles, 516, 517
typhus, 1135

Assam
Anopheles, 217, 1002
typhus, 133
ulcer, tropical, 86

Borneo
filariasis, 67
malaria, 909

Burma
amoebiasis in forces returning from, 469
anaemia, 491
Anopheles, 210, (517), 1002
Bandicota bengalensis in Rangoon, 256
malaria, 210
mosquitoes, 210
plague, 256
rodent ectoparasites, 256
typhus, 133

Ceylon
Aëdes and filariasis, 487
Anopheles, 487, (517)
Armigeres obturbans and filariasis, 487
filariasis, 486
Phlebotomus, 974, 975

China
amoebiasis in Ya Tan Tze, 366
ankylostomiasis, 486
in dogs in Szechuan, 376
Anopheles, 219, 603
in Szechuan, 429
blackwater fever, 603
cholera, 359
Clonorchis sinensis, 152
in Shanghai, 648
Szechuan, 376
coccidiosis, 261
gnathostomiasis, 1070
helminthiasis, 376
leishmaniasis. 129, 244, 342
malaria, 219, 428
mosquitoes, 581
plague, 256, 257
relapsing fever, 471
rodent ectoparasites, 357
schistosomiasis, 60, 429, 559, 647, 648
tapeworm in dogs, 376
typhus, 1024
in Peiping, 346

Cochin-China
malaria, 328
plague, 357

Cyprus
Anopheles, 807
malaria, 16
relapsing fever, 470

Far East
deficiency diseases, 71

India and Pakistan
amoebiasis, 466, 469, 741, 939
in forces returning from, 362, 469
anaemia in Punjab, 771
Anopheles, 11, 17, 110, (517)
cholera in Bengal, 40
deficiency disease, 73, 389, 767
dysentery, 741
leishmaniasis, 126, 622, 925
leprosy, 45, 373, 570, 745
malaria, 6, 11, 16, 17, 109, 110, 436, 612
plague, 33, 34, 35, 934
schistosomiasis, 947
sprue, 770, 861, 965
Trombicula deliensis, 820
Trypanosoma kalawanensis in *A. culicifacies*, 126
typhus in Calcutta, 718, 719, 721
ulcer, tropical, 969

Indo-China
Anopheles, 206
malaria, 206, 705
myiasis, 286
rodent ectoparasites in Saigon, 357
typhus, 23
yaws, 1049

Iraq
public health, 417
schistosomiasis, 554, 555, 846

Israel (see also Palestine)
Q fever, 1026, 1137
typhus, 820
venoms, 867

Japan
Aëdes aegypti in Kainanto, (499)
amoebiasis, 547
ankylostomiasis in Okinawa, 154
Anopheles in Formosa, 900
ascariasis in Okinawa, 155
coccidiosis, 261
gnathostomiasis, 1070
helminthiasis in Okinawa, 154
malaria, (429)
schistosomiasis, 482
trichuriasis in Okinawa, 155
typhus, 23
in Korea, 23

Java
Anisus, host of echinostome, 63, 64
histoplasmosis, 869
rodent ectoparasites, 63
typhus in Batavia, 1024

Lebanon
Anopheles in Azouniyeh, 707
malaria, 1109

Malaya
Anopheles, 11, 709
blood blister disease in Singapore, 73
deficiency diseases, 73, 277, 278
gnathostomiasis, 857, 1071
health conditions, (524), 588, 987
typhus, 247, 1135

Netherlands East Indies
actinomycosis, 83
amoebiasis, 145
Anopheles, 110
malaria, 110
schistosomiasis, 59
yaws, 45

North Borneo
Anopheles, (800), 1002

Palestine (see also Israel)
relapsing fever, 1045

Persia
amoebiasis, 632
dysentery, 632
relapsing fever, 43

Persian Gulf area
typhus, 25

Philippines
anaemia, 954
ankylostomiasis, 954
Anopheles, 612
ascariasis, 152
balantidiasis, 152
beriberi, 390
helminthiasis, 152
malaria, 1003
schistosomiasis, 152
trichuriasis, 152

Syria
schistosomiasis, (150), 845

Thailand
Anopheles, 11
gnathostomiasis, 1069

Turkey
histoplasmosis, 84
leishmaniasis, 21
Q fever, 352
rabies, 139
typhus, 343

AFRICA

Abyssinia (see Ethiopia)

Africa
anaemia, 665
trypanosomiasis, 123

Africa, Central
Aëdes, 932
cardiovascular disease, 575
health conditions, 179
malaria, 428
schistosomiasis, 846
yellow fever, 932

Africa, East
Anopheles, 209
deficiency diseases, 158
Glossina, 532
leishmaniasis, (1133),
mosquitoes, 172
schistosomiasis, 266, 555
trypanosomiasis, 231
ulcer, tropical, 285

Africa, French Equatorial
ankylostomiasis in Gabon, 844
ascariasis in Gabon, 644
blackwater fever, 120
intestinal parasites, 844
Strongyloides, 844
trichuriasis, 844
trypanosomiasis, 1012

Africa, French West
Glossina, 921
Phlebotomus, (499)
relapsing fever, 1046, 1047
trypanosomiasis, 123, 224

Africa, North
amoebiasis, 546
Buthus occitanus stings, 280
leishmaniasis, 1132
relapsing fever, 42, 838

Africa, Portuguese East
schistosomiasis, 1056
trypanosomiasis, 531

Africa, Portuguese West
trypanosomiasis, 530

Africa, West
Anchau Settlement Scheme, 229, 1128
Anopheles, 697
deficiency disease, 964
experimental animal colony, 587
loiasis, 563
relapsing fever, 1046
Trypanosoma simiae, 222
trypanosomiasis, 221, 222

Algeria
malaria, 897
schistosomiasis, 1153

Anglo-Egyptian Sudan
Acanthocheilonema perstans, 957
deficiency diseases, 74
filariasis, 956, 957
onchocerciasis, 957
Simulium, (387), 404
trypanosomiasis, 224
typhus, 1021

Angola
trypanosomiasis, 531

Bechuanaland
water resources, 676

Belgian Congo
Acanthocheilonema perstans, 602
Anopheles, 330, 601
health of, 1189
leprosy, 146
malaria, 214, 601, 699, 897, 908
mosquitoes, 329
plague, 737
public health report, 415, 1189
schistosomiasis, 754
Simulium, 387
Trypanosoma uniforme, 224
trypanosomiasis, 224, (338), 913
typhus, 22
yellow fever, 136

Cameroons
filariasis, 563, 1066

Cape Verde Islands
Anopheles, 208, 209
malaria, 208

Egypt
Anopheles, 438, 516, 523
Ayerza's disease, 847
balantidiasis, 942
cholera, 359, 462, 1029
deficiency diseases, 389
dysentery, 942
malaria, 438
schistosomiasis, 57, 150, (380), 643, 646, 845

Eritrea
Anaplasma marginale in rodents of Asmara, 1161
Bartonella muris in rodents of Asmara, 1161
Hymenolepis, 1161
malaria, 213, (696), 705
typhus, 344

Ethiopia (Abyssinia)
ascariasis, 1033
intestinal parasites, 1032
leishmaniasis, 342
Phlebotomus, 1088
schistosomiasis, 1033
tapeworm infections, 1033
trichiniasis, 1033
typhus, 450, 451

Fernando Pó
diseases, 880
Glossina, 124
trypanosomiasis, 124

French Guinea
trypanosomiasis, 712

French Sudan
leishmaniasis, 816
Phlebotomus, 816

Gambia
Glossina, 228
trypanosomiasis, 229

Gold Coast
deficiency diseases, 278
Glossina, 221, 226
trypanosomiasis, 221, 226, 227

Ivory Coast
Aëdes aegypti, 1186

Kenya
Aëdes adersi and jungle yellow fever, 542
Aëdes aegypti and jungle yellow fever, 542
ankylostomiasis, 641
in Nairobi, 432
Anopheles, 898
in Nairobi, 1104
ascariasis, 432, 641
balantidiasis, 641
Blastocystis, 70
cancer, 569
Cercomonas, 70
coccidiosis, 641
enterobiasis, 70
Glossina, 237, 337
helminthiasis, 641
leprosy, 638
malaria, 432, 606, 898, 1104, 1114
onchocerciasis, 854
parasitological survey, 641
schistosomiasis, 151, 432, 641
Simulium, 854
tapeworm infection, 70, 641, 952
trypanosomiasis, 237
water resources, 676
yellow fever, 542

Liberia
Aëdes aegypti, 587
Anopheles, 587
health missions, 587
trypanosomiasis, 224

Madagascar
dengue, 30
plague, 357
Simulium, (1088)

Mauritius
Anopheles, 516, 1117
mosquitoes, 516

Morocco
Anopheles, 317, 432
malaria, 1008, 1096
public health, 1097
social welfare, 1097

Mozambique
trypanosomiasis, 530

Nigeria
Aëdes, 823
Glossina, 225
leprosy, 265
trypanosomiasis, 221

Northern Rhodesia
trypanosomiasis, 531, 532
water resources, 676

Nyasaland
ulcer, tropical, 285
water resources, 676

Portuguese Guinea
ankylostomiasis, 844, 1013
Anopheles, 1105
ascariasis, 844
enterobiasis, 844
filariasis, 1013, 1105
intestinal parasites, 844
leprosy, 1013
malaria, 1105
Strongyloides, 844
tapeworm infection, 844
trichuriasis, 844
trypanosomiasis, 530, 1013

Ruanda Urundi
mosquitoes, 876

Sierra Leone
Glossina, 227
trypanosomiasis, 227, 228, 238
yaws, 549

Socotra
Aëdes, 11
Anopheles, 11
mosquitoes, 10

Somaliland
ulcer, tropical, 781

Southern Rhodesia
population survey, 418
schistosomiasis, 267

Tanganyika
water resources, 676

Togoland
typhus, 348

Tripolitania
ainhum, 1087

Tunisia
leishmania, 341

Uganda
Aëdes, 457, 823, 824, 932
anaemia, 664
Anopheles, 9, 10
leprosy, 263
malaria, 9, 10
mosquitoes, (137), 458
water resources, 676
yaws, 472
yellow fever in monkeys, 457, 823, 932

Union of South Africa
ankylostomiasis in Durban, 751
ascariasis, 751
deficiency diseases, 159
enterobiasis in Durban, 751
helminthiasis, 751
histoplasmosis, 570
Hymenolepis, 751
plague, 31
schistosomiasis, 751
tapeworm infection in Durban, 751
trichuriasis, 751

AMERICA, NORTH

America, North
trombiculid mites, 877

Canada
Aëdes
control in Alaska, (1088)
in Manitoba, 580
amoebiasis, 635
ankylostomiasis in dogs in Alberta, 677
coccidiosis in dogs, 677
enterobiasis in Esquimos, 376
helminthiasis, 376
mosquitoes, 580, (1088)
plague, 143
Simulium in Manitoba, 581
trichiniasis, (488)

Greenland
trichiniasis, (71)

U.S.A.
Aëdes aegypti in Arizona, 582
Amblyomma in Florida, 349
amoebiasis in Chicago, 1031
anaemia in South Carolina, 1075
Anopheles
in Florida, 111
South Carolina, 1002
Bureau of Vector Control, California, 500
fascioliasis in Texas, 62
histoplasmosis, 570
in rats, 495
hydatid disease, 650
leishmaniasis, 450
malaria, 440, 500
mosquitoes in California, 290
Phlebotomus in Florida, (876)
plague
in California, 500, 630
New Mexico, 1144
Q fever
in California, 252, 352, 353, 454, 500, 727, 932, 1138
Pennsylvania, 455
Texas, 726
rabies in Alaska, 1028
trichiniasis in Mississippi, 488
Trypanosoma cruzi
in bugs and mammals, 923
insects in Arizona, 619
typhus, 247, 251
in California, 500
Florida, 349
Kentucky, 625
Texas, 819

AMERICA, CENTRAL

America, Central
Anopheles, 441
Simulium, 565

British Honduras
Settlement Commission report, 502

Costa Rica
cardiovascular disease, 1084
fascioliasis, 153
filariasis, 562
leishmaniasis, 342

Guatemala
onchocerciasis, 855

Mexico
Anopheles, 429, (900), 1119
in Veracruz, 899
Chagasia bathanus in Veracruz, 899
malaria, 429, 806, 898
onchocerciasis, 564
rabies, 254
rodent ectoparasites, 499
Simulium, 407, 564, (876)
trichiniasis, (388)
typhus, 130, 134, 536, 625, 719

Panama
malaria, 114
myiasis, 91
Q fever, 455
yellow fever, 1139

Salvador
Anopheles, 6
malaria, 6

WEST INDIES

Caribbean area
Aëdes aegypti, 675
filariasis in Aruba, 675
mosquitoes, 675, 876

Cuba
Behcet's syndrome, 91
leprosy, 842
tapeworm infection, 953

Dominican Republic
schistosomiasis, 558

Guadeloupe
leprosy, (148)
typhus, (249)

Jamaica
leprosy, 263

Haiti
mosquitoes, (112)
yaws, 551

Netherlands West Indies
anaemia, 966
filariasis, 408
mosquitoes, 408, 876
schistosomiasis, 754

Porto Rico
Anopheles, 218, 318
schistosomiasis, 558
sprue, 391
typhus, 132, 245

Trinidad
Artibeus planirostris trinitatis and rabies, 254
leprosy, 263
rabies, 254

Virgin Islands
filariasis, 1066

West Indies
leprosy, 263

AMERICA, SOUTH

America, South
- blastomycosis, 84, 168, 397
- leishmaniasis, 127
- *Phlebotomus*, 127
- trypanosomiasis, 534

Argentina
- *Anopheles*, 332
- balantidiasis, (42)
- coccidioidomycosis, 167, 1173, 1175
- dysentery, (42)
- histoplasmosis, 968
- hydatid disease, (1062)
- malaria, 1000
- trypanosomiasis, 534
- ulcerative colitis, (42)
- venoms, 967

Bolivia
- *Anopheles*, 218
- malaria, 218
- typhus, 131

Brazil
- *Amblyomma*, 930
- anaemia
  - in Indians, 666
  - São Paulo, 863
- ankylostomiasis, 863
- *Anopheles*, 319
  - in Amazonia, 331
  - Rio de Janeiro, 514
- Ayerza's disease, 847
- *Chagasia rozeboomi*, 289
- deficiency diseases, 163
- health conditions, 1190
- helminthiasis, 485
- leishmaniasis, 343, 714
- leprosy, 49, 53, 1148
- malaria, 331, 513
- rural hygiene, 1191
- schistosomiasis, 643, 847, 1058
- *Strongyloides*, 853
- trichuriasis, (70)
- tropical diseases, 1190
- *Trypanosoma cruzi* in blood donors, 813
- trypanosomiasis, 124, 620
- typhus, 349, 725, 930
- yellow fever, 1027

British Guiana
- *Aëdes aegypti* control, 1120
- ankylostomiasis, 589
- *Anopheles*, 589
- filariasis, 589, 654
- leprosy, 263
- Settlement Commission report, 502

Chile
- *Anopheles*, 1008
  - in Tarapaca, 112
- hydatid disease, 852, 951
- malaria, 1008
- myiasis, 1087
- trichiniasis, 859
- trypanosomiasis, 449, 1128

Colombia
- *Anopheles*, 698
- arthropods, (92)
- helminthiasis, 1055
- intestinal parasites, 1055
- leishmaniasis, 622
- leprosy, 552
- *Phlebotomus*, 622, 623
- relapsing fever, 367

Dutch Guiana
- *Anopheles*, 698

Ecuador
- actinomycosis, 573
- amoebiasis in children, 573
- bartonellosis, 573
- brucellosis, 573
- chromoblastomycosis, 573
- climate and disease, 572
- coccidiosis, 573
- dysentery, 573
- filariasis, 573
- helminthiasis, 573
- hydatid disease, 573
- intestinal parasites, (376)
- leprosy, 573
- malaria, 573
- plague, 573
- rabies, 573
- relapsing fever, 367
- trypanosomiasis, 1017

French Guiana
- ankylostomiasis, 853
- *Anopheles*, (289)
- leprosy, 477
- myiasis, (582)
- *Phlebotomus*, (94), (582)
- *Trypanosoma conorrhini*, (924)

Martinique
- *Anopheles*, 318
- filariasis, 274
- rickettsial disease, (451)

Paraguay
- amoebiasis, 362

Peru
- *Anopheles*, 12
- deficiency diseases, 160
- malaria, 805, 1027
- typhus, 537

Uruguay
- hydatid disease, 383
- rabies, 140
- *Trypanosoma cruzi*, 241
- trypanosomiasis, 241, 619

Venezuela
- *Anopheles*, 12, 210, 211, (211)
- ascariasis, 273
- helminthiasis, 752
- *Hymenolepis*, 273
- malaria, 6, 210, 211
- *Phlebotomus*, (94), (582)
- plague, 255
- rabies, 824
- schistosomiasis, 269, 755, 756
- sprue, 279
- tapeworm infection, 273
- trichuriasis, 273
- typhus, 718

AUSTRALASIA

Australasia
Aëdes, (974)

Australia
Aëdes australiensis in Queensland, (581)
anaemia, 966
ankylostomiasis in Queensland, 852
Austrosimulium bancrofti in Queensland, 406
health of aborigines, 1098
histoplasmosis, 397
leprosy, (368)
in Queensland, 841
mosquitoes, (581)
Simulium in Queensland, 406
toxoplasmosis in Perth, 875
typhus, 346

PACIFIC ISLANDS

Fiji
anaemia, 392
deficiency diseases, 768

Micronesia
health service programme, 585

New Caledonia
filariasis, 155

New Guinea
Aëdes, 1187
Anopheles, 1105
filariasis, 1105
malaria, 602

South West Pacific
coccidiosis, 261

Printed by His Majesty's Stationery Office Press, Drury Lane, W.C.2
(10859) Wt. P0632—375 K21 10/51 D.L.